

COMPUTER DECISIONS

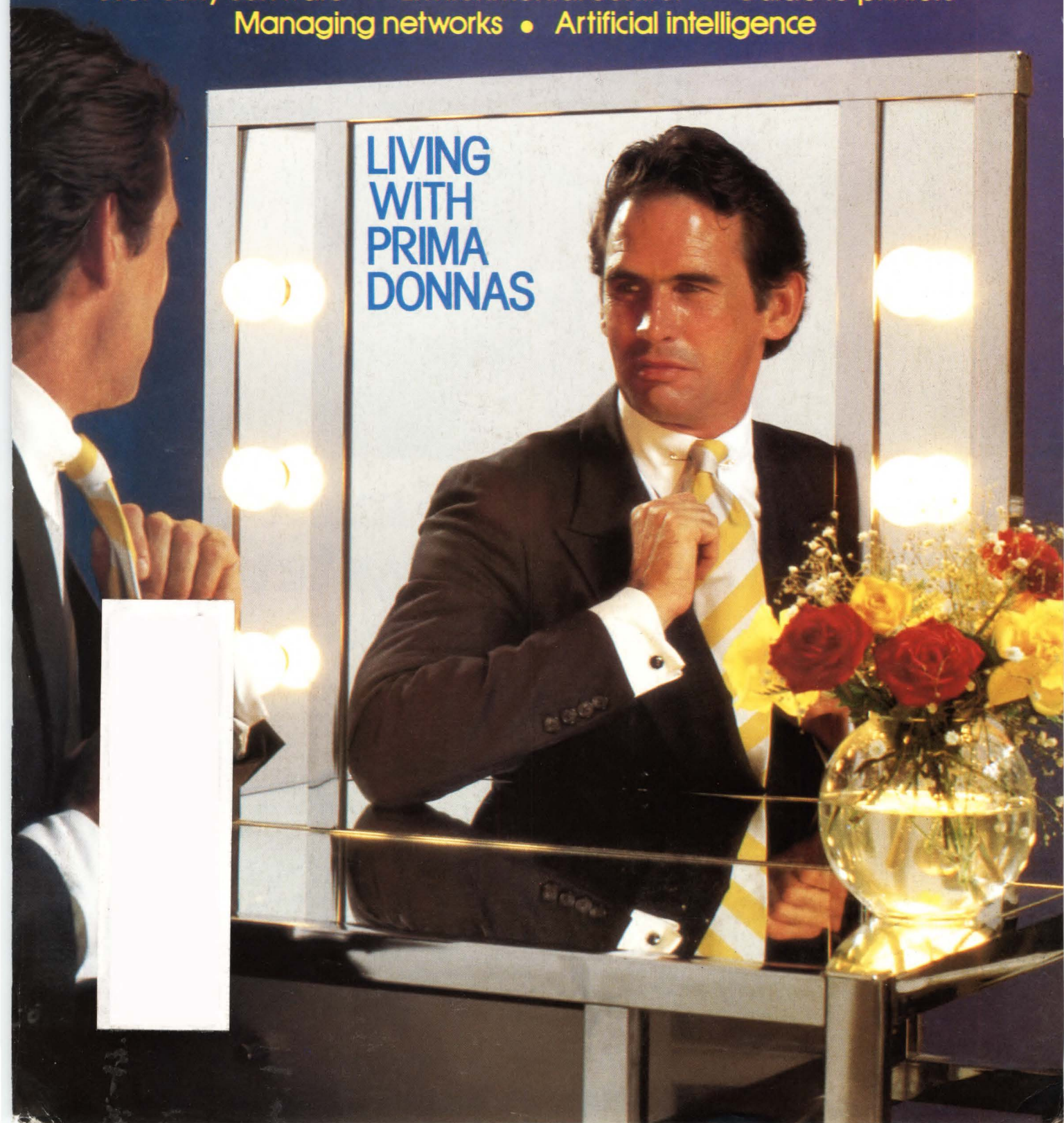
AUGUST 1984

THE MANAGEMENT MAGAZINE OF COMPUTING

A HAYDEN PUBLICATION

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AUGUST 1984

Volume 16 Number 10

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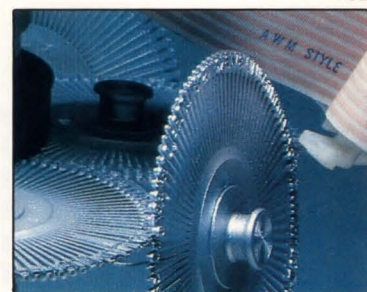
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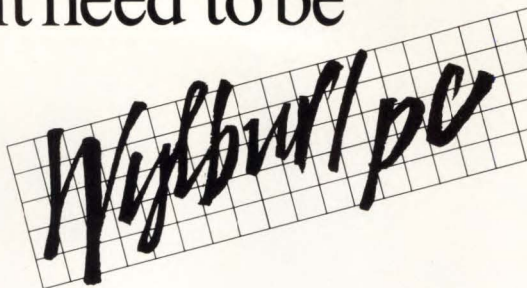
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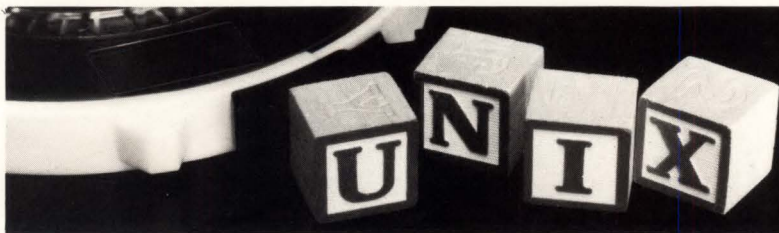
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WAS UP TO HERE
IN WORK."



"AND ROUTINE
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TO MY BACKLOG—
UNTIL I HEARD ABOUT
THE SOLUTION
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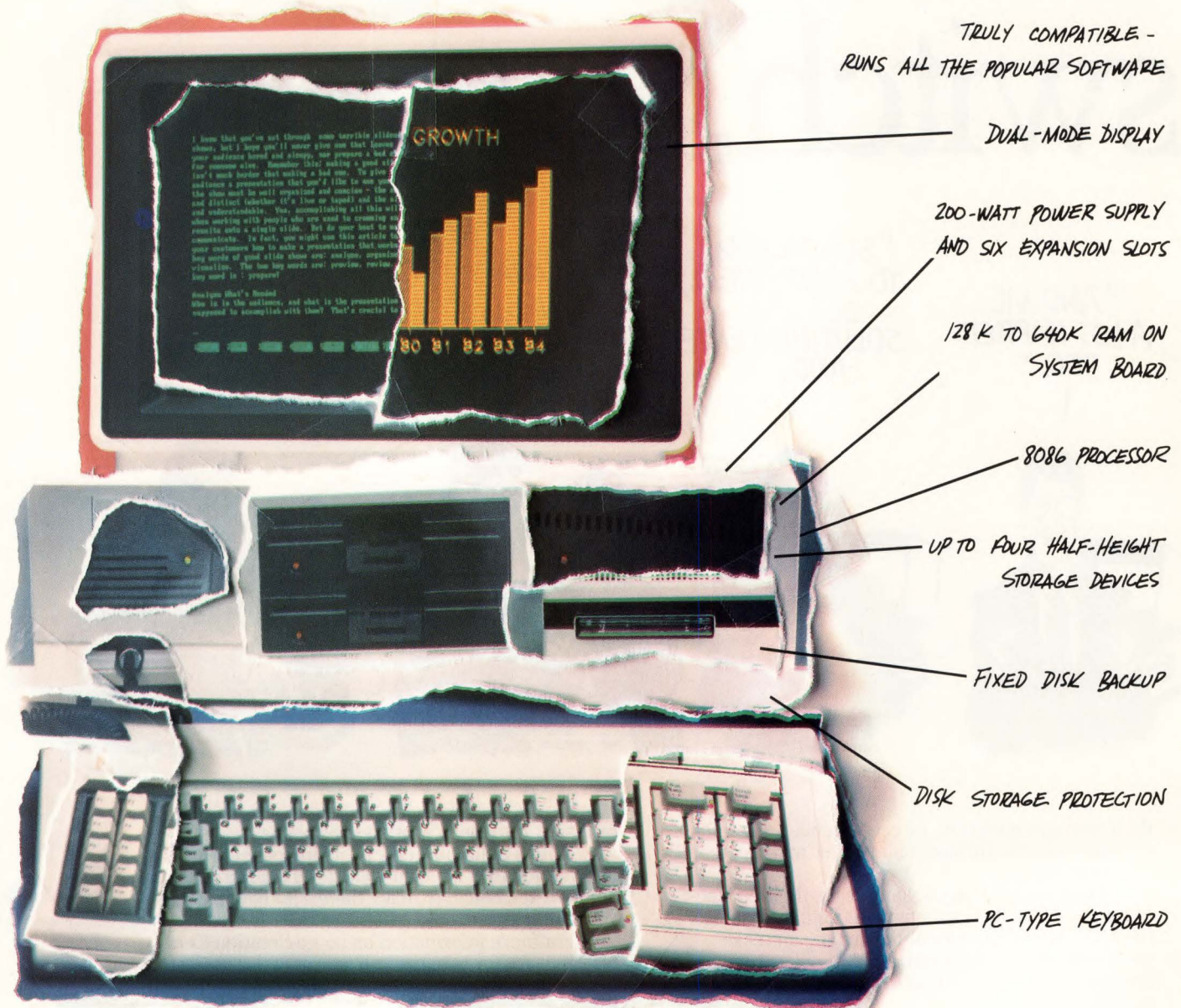
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CIRCLE 8

INSIGHT

Will GMC challenge IBM?

The long-awaited competition between AT&T and IBM is slowly shaping up, but watch out for General Motors Corp. GMC is about to acquire Electronic Data Systems of Dallas, putting it in position to begin competing with IBM for data-processing business.

Is GMC a real threat to IBM? Big Blue enjoys a dominance of dp that hasn't reached its limits. "The Top 100 in data processing" report published in June revealed that IBM is still growing—its share of total dp revenues increased last year to a whopping 41 percent.

Successful competitors are scoring by undercutting single IBM product lines, but the body corporate seems impervious. However, GMC—if it has the will—may present a tougher challenge to Big Blue.

A major motivation for acquiring EDS was GMC's own enormous information-processing needs. However, Roger Smith, GMC's chief executive, is determined to diversify the auto-manufacturing giant. Before cutting the EDS deal, GMC bought a small software house in California. Other acquisitions are certainly possible, including some of the Top 10 on this year's Top 100 listing. In particular, members of "the Bunch"—Burroughs, Sperry (formerly Univac), NCR, Control Data, and Honeywell—seem unable to expand beyond their current roster of mainframe customers. As IBM's share of

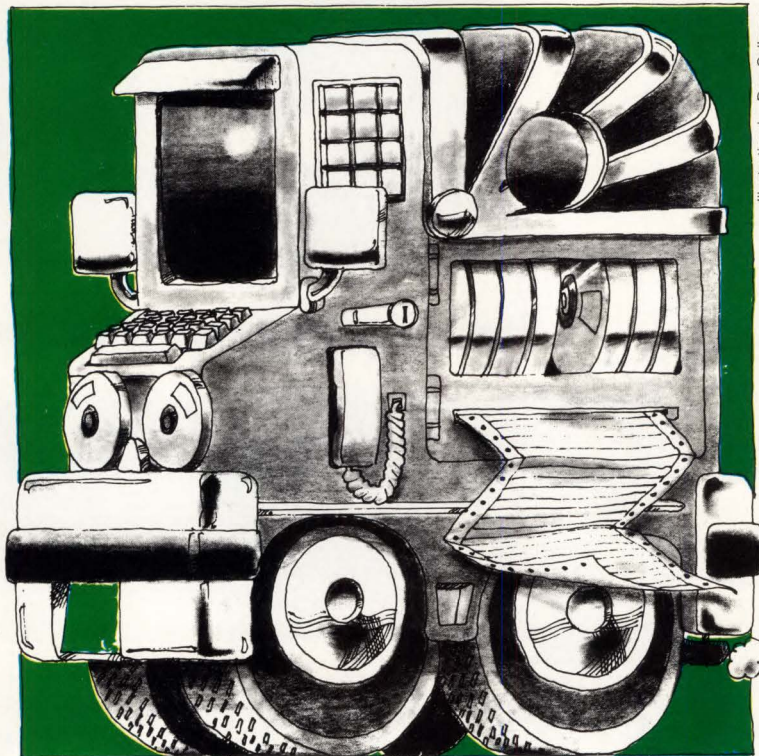


Illustration by Dan Culhane

They lacked sufficient resources for a long and bloody fight with IBM. GMC has such resources at its command. But it also has another big advantage over other non-dp corporations that have tried their luck in dp: GMC itself is a huge market for nearly all kinds of dp hardware, software, and services. GMC is not only the world's largest maker of cars and trucks, but also the largest manufacturer of locomotives. GMC's needs in computer-aided-design and -manufacturing (CAD/CAM) and computer-aided engineering (CAE) systems, industrial

robots, and general software and systems are enormous. GMC's many thousands of dealers also represent a major market for hardware and computer and telecommunications services. EDS has experience serving Blue Cross/Blue Shield agencies, which should help in serving the needs of car dealerships.

If GMC expands into the information-processing business, it would be wise to heed the lessons learned by other non-dp giants that attempted to diversify into computers. Theirs is a legacy of failure. RCA, General Electric, Philco, and Xerox all failed in large-computer ventures. More recently, Raytheon stopped manufacturing terminals and word-processing equipment because it had lost its position as a low-cost alternative to IBM. Big Blue itself is now the lowest-cost producer of 3270-compatible terminals.

Why did these conglomerates fail?

If GMC decides to diversify into information processing, however, a nonfinancial factor will decide its fate. There's no doubt GMC has the financial and marketing might to become the third superpower in information processing, along with IBM and AT&T. Still, joining the competition is only the beginning. A successful challenge against IBM—for either AT&T or GMC—will demand an unbending will to fight.

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NEWS & COMMENT

AT&T: The waiting is not over yet

Executives who have been unable to get private telecommunications lines take heart: AT&T officials claim your long wait will soon be over. By the end of this month, customers who have been cooling their heels for months will see action.

"After August, our capacity to handle private-line orders will be far greater than the incoming volume," says Jim Byrnes, staff manager for media relations at AT&T Communications, Morristown, NJ. "We will not only be able to handle current orders, but we will also process those for which we have missed the due dates," Byrnes says.

At press time, customers ordering AT&T private lines were being promised installation in 48 working days, or 10 weeks. "We will not cut back on that interval," asserts Byrnes, "until we can get our on-time reliability close to the 95 percent rate we had before divestiture." AT&T's goal is to reclaim its tarnished reputation for on-time service, he says.

AT&T's inability to keep up with orders has forced much of corporate America to go "cold turkey." Many corporations have come to rely on pri-

vate lines. "There are two reasons companies opt for dedicated lines," explains Ronald Roshong, MIS manager at F.G. Montabert (New York) and one of the many data-processing executives who has been frustrated by AT&T's delays. "One is that a dedicated line provides a clean, straight link to remote offices. There are no interruptions, no switches. The second reason is that the cost per call drops below what it would be if you used dialup service." F.G. Montabert's private line costs about \$900 a month, Roshong reports. "But it's ours to use as we see fit 24 hours a day."

Some vendors, including MCI (Washington) and GTE Sprint (Burlingame, CA), offer alternatives for businesses that need dedicated lines. "But," says Roshong, "they're not always willing to install lines in areas that don't guarantee sizable customer bases. Our company needed a line to New Hampshire, and the alternative common carriers were not willing to go to New Hampshire at the time." AT&T promised to install a line to New Hampshire, and after a delay, it did, says Roshong.

When Roshong first placed his order for a dedicated line, he was told to

expect lead time of 45 to 50 days. However, a week later, AT&T asked that the order be resubmitted—and raised the estimated lead time to three or four months. About two weeks before the target date, the local Bell operating company came in to do the local hookup. Says Roshong, "I assumed, which I should not have, that the connection was finished, and we were ready to go." Roshong went to his company's New Hampshire office to run tests, but the line didn't work. "AT&T had not completed the long lines yet," he explains. "We were told it would take two or three more weeks."

An AT&T representative was able to expedite the order, and the work was completed during the following week. "We did get the line in, and it worked the first time," said Roshong. "With all my experience in data processing and communications, I have never seen a dedicated line go up the first time." The line failed a week after it was installed, but one hour after Roshong called for service, it was fixed, he adds.

To help clear up the backlog of orders, AT&T is increasing its workforce, Byrnes says. Before divestiture, it was estimated that AT&T would need about 2,500 workers to meet the demand for new circuits. Since the beginning of February, an additional 2,100 employees have been hired.

AT&T is also bolstering its efforts to clear the tangle of order forms for private lines. It has raised the number of hours its computer systems are used to process orders to 16 hours a day, from eight. In addition, an outside consultant, Electronic Data Systems (Dallas), has been brought in to standardize AT&T's order-processing procedures. However, the standard has not been implemented yet.

One big flaw in the ordering process—and the biggest barrier to stan-

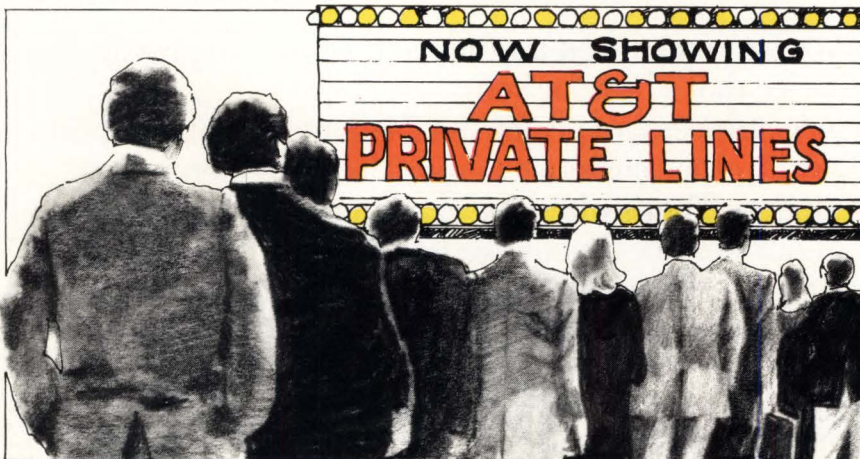
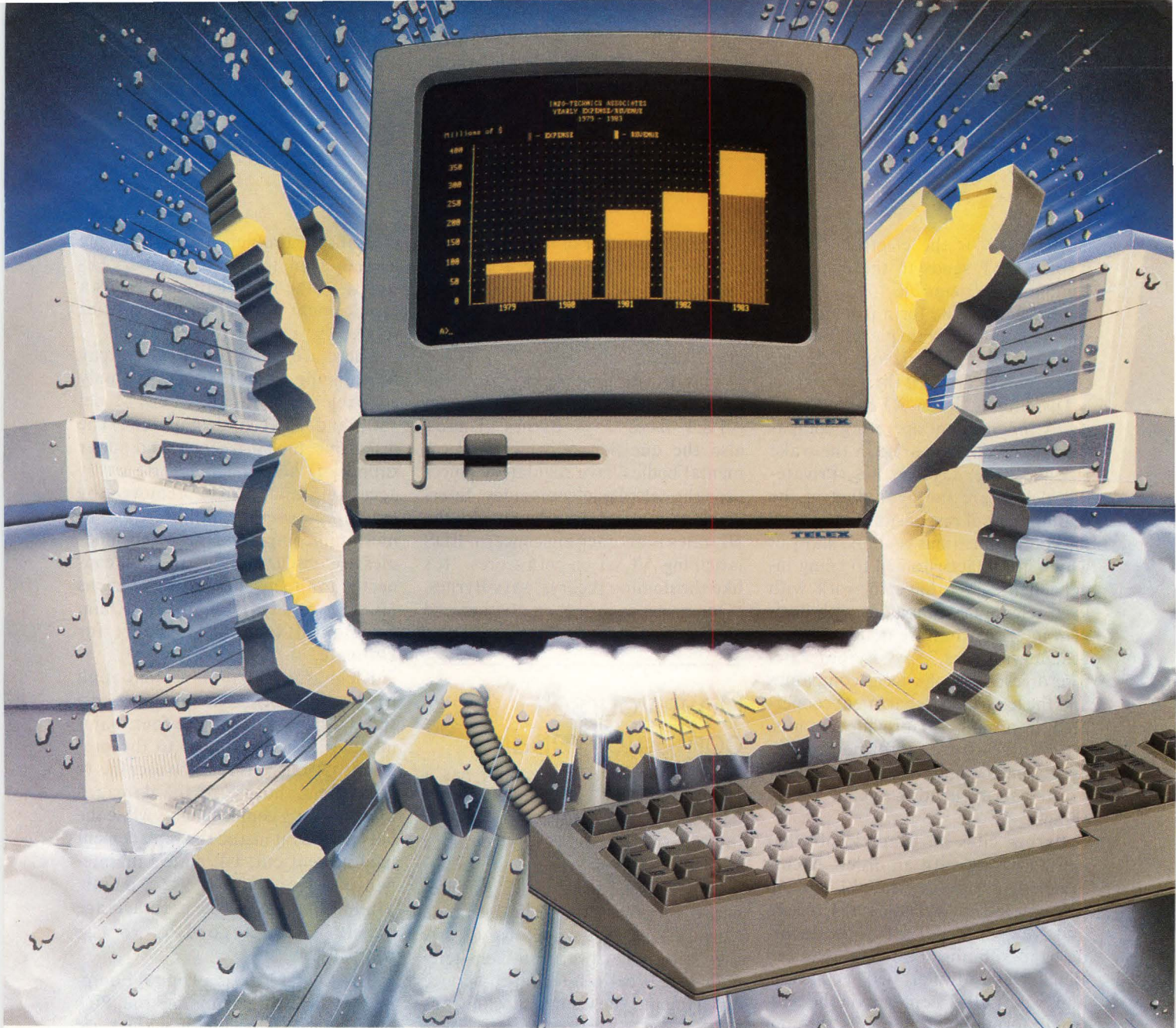


Illustration by Dan Cullane



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NEWS & COMMENT

dardization—is the electronic order form AT&T sends to the operating companies responsible for installing the local link. The form is long, with space for 240 separate pieces of information. More important, different companies interpret it their own ways.

Disputes between AT&T and the newly independent operating companies were bound to arise in the wake of divestiture, says Byrnes. Private-line delays are the byproduct of the realignment of responsibilities among telecommunications vendors, many of which are unaccustomed to being independent. "We have to work with local telephone companies with business interests that are no longer congruent with ours," says Byrnes. "Before divestiture, the local companies and the long-lines department cooperated informally to provide circuits. After divestiture, informal procedures ended, and were replaced by highly structured ways of doing things."

Byrnes cites an example of what can go wrong with an order: A customer requests a dedicated line from its home office in Dallas to Chicago and New York. AT&T takes the order and submits it to Southwestern Bell in Dallas, Illinois Bell in Chicago, and New York Telephone via the electronic form. The order sails through until New York Telephone balks, claiming that one of the 240 pieces of information is insufficient. New York Telephone rejects the order; the customer waits.

"AT&T is trying to process 25,000 private-line orders a month—many of them multi-point circuits," says Byrnes. "With operating companies rejecting orders, things can get pretty confusing. Each point on the circuit brings in a different local telephone company, each of which interprets each element on our standard form differently. The key to on-time installation is getting all the companies to work together at the same time."

AT&T and EDS have been working together since late April analyzing the elements on the order form and determining which ones are causing

the largest number of rejections. This process should help AT&T and the local telephone companies agree on new procedural guidelines. "A standard form should cut through the delays," says Byrnes.

The private-line backlog isn't the only—or the biggest—problem AT&T faces, says Byrnes. There's also the question of which governmental bodies have regulatory power over the telephone companies. Interpreting the tariff requirements for the 50 states is another big concern. EDS is helping AT&T on both scores. "It's like the domino theory," says Byrnes. "One problem brings on another and another."

—Theresa Conlon

Do-it-yourself computer repairs

A minicomputer vendor has a new program that eliminates costly service calls by enlisting users and overnight courier services.

The Computer Assisted Maintenance Program from The Ultimate Corp., Clark, NJ, works like this: A user with a hardware problem telephones Ultimate's technical-service department. The vendor's technicians

pinpoint the problem and instruct the user to send the faulty part to Ultimate in the mail. Ultimate sends a replacement via overnight courier service.

There are two catches: Users pay for shipping, and the program is only available on Ultimate's new Model 1500 and 1510 minicomputers. The disk drive, tape drive, cpu, and power supply of these machines are easily accessible and can be removed by loosening several thumbscrews. In most minicomputers, these four modules are obscured by wiring and connected to the machine by as many as 10 screws, says Donald H. Klein, director of technical support for Ultimate.

Klein asserts that 90 percent of all hardware problems can be traced to a specific part in one of the four major modules. The drawback to the program, obviously, is that the user has to go without the use of the damaged machine for a couple of days while the old part is sent in and the replacement module sent out. Ultimate's maintenance service starts at \$95 a month. Mailing charges for the parts average about \$100, according to the company.

The Model 1500 is a Digital Equipment Corp. mini running the Pick operating system. The machines are used for general office applications such as database management. A basic design with 256 Kbytes of memory, a 19-Mbyte hard disk, a $\frac{1}{4}$ -inch tape drive, seven open ports, and a serial printer costs \$27,500. For information, call (201) 388-8800.



Privacy passé in office design

When designing offices, proper acoustics and appropriate furnishings are more important to productivity than privacy and the square footage allotted to each employee.

This is one finding of "Designing for Productivity," a survey by the American Society of Interior De-

Trial & Error

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signers (ASID) in conjunction with *Contract Magazine*, an interior-design publication. "It is not the size and nature of the space that must be accounted for when designing, but the way in which the space accommodates workers," says William Richards Whaley, ASID president. Virtually all of the 615 professional designers who participated in the survey (97 percent) said they devote much of their time to designing offices to accommodate computers and word processors.

More than two-thirds of the designers felt that privacy is not essential for a productive environment. Also, three-quarters of the respondents reported a trend toward smaller-sized work areas for middle managers and clerical workers. In fact, the survey acknowledged a trend toward a reduction in space at all employee levels.

"The cost of space is going up," says Whaley. "Productivity must increase, but in a smaller amount of space. As surroundings become more cramped

and noise levels from machines increase, companies have to make major efforts to ensure employee comfort," he says.

Given a list of 16 design elements, respondents rated lighting, acoustics, modular furniture, and climate control as the most important design influences on productivity. Of the same elements, respondents believed that their clients thought lighting, acoustics, partitions between offices, and elimination of distractions were most important.

More than four out of five designers (82 percent) claimed that well-designed offices would increase the productivity of clerical employees. However, they believed design factors have a lesser impact on productivity as the status of the employee increases.

Conclusions were drawn from a four-page questionnaire sent to 2,400 ASID members. Results are available for \$25. For more information, write Productivity Survey, ASID National Headquarters, 1430 Broadway, New York, NY 10018.

Supercomputers: ignored potential?

Why do so few Fortune 500 companies use supercomputers? Kenneth G. Wilson, winner of the 1982 Nobel Prize in physics, believes it's because there are no young lions to champion supercomputer applications in industry.

The absence of supercomputer advocates is a reflection of the lack of supercomputers on college and university campuses, Wilson says. Doctoral students in science and engineering are immersed in a "VAX culture," Wilson told the American Association for the Advancement of Science in a recent speech in New York. Digital Equipment Corp.'s VAX superminicomputers dominate in universities, and almost all of the Ph.D. candidates in the country are working on them.

"It is urgent that Ph.D. candidates gain experience with supercomputers so that when they graduate, they will bring the advantages of supercomputers with them to industry," said Wilson. In the near future, supercomputers will be vital tools for designing and testing new products. "Imagine being able to design a jet fighter and simulate its flight, or design and test a new drug at a computer terminal in just hours or days," Wilson said. "This is the promise of supercomputers, a promise that will have to be realized if American industry is to remain competitive in world markets."

Unfortunately, there's no program to help universities acquire supercomputers, either via government grants, private purchases, or other avenues. Increased cooperation and better lines of communication between universities, the computer industry, corporations, and the government are needed to harness the enormous power of supercomputers, Wilson said. User corporations should recognize that universities can sow the seeds for valuable supercomputer software. Many industrial and engineering software packages for mainframes and

Safety glasses for VDT operators

Everyone knows anti-glare screens can eliminate VDT glare. But a San Francisco company is taking a different approach with its safety glasses for users. In effect, the glasses move the glare-cutting screen two feet in front of the VDT to help combat eyestrain and fatigue.

The CR-39 glasses from Pacific Trade are supposed to absorb 98 percent of the ultraviolet light emitted by VDTs, 10 percent of the infrared light, and 80 percent of the glare.

Although most VDTs are equipped with a nonglare plastic screen, this protective measure doesn't eliminate all of the reflection and glare produced by overhead lights, claims Pacific Trade. The CR-39 fends off overhead light with a polarized filter lens laminated in several layers of plastic. The lens admits light from only one direction and blocks out all other incoming light. "This enables the computer operator to see images more clearly," says Yoji Yamamoto, director of Pacific Trade.

The filtered lens reduces the brightness of the screen below the level where the human eye identifies screen flicker. The lens is also modified with a graphite filter to absorb 98 percent of the low-level emissions of ultraviolet radiation from the terminal screen.

The CR-39 glasses are made of very hard plastic and are heat-, impact-, and scratch-resistant, Yamamoto claims. The glasses come in two models (one for men and one for women) and are styled after popular eyewear fashions, says Yamamoto.

The CR-39 glasses are available through Pacific Trade for under \$40; clip-on lenses cost \$16. For information, call (415) 655-9340.

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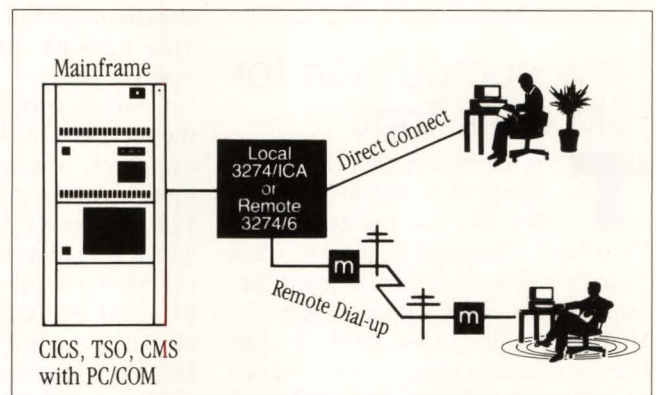
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NEWS & COMMENT

minis were developed at universities and then produced for businesses by software houses. If universities had supercomputers, businesses would begin seeing more supercomputer software.

One barrier to the widespread use of supercomputers on campus is cost, noted Wilson, who is the James A. Weeks Professor of Physical Science at Cornell University, Ithaca, NY. Each supercomputer is handcrafted at a cost of more than \$10 million. However, with current advances in chip design, it is possible to mass-produce supercomputers for under \$1 million each, he said.

New competition for IBM desk-tops

The clones of the IBM Personal Computer used to look like PCs, run software like PCs, but were priced significantly less than PCs. The newest PC compatibles from AT&T and Compaq have prices that are similar to the IBM PC, but they run several times faster. The advantage of speed will last at least until Big Blue updates the machine it introduced in 1981.

Rod Canion, president of the Houston-based Compaq Computer Corp., counts several features that set his company's new Deskpro line of desk-top computers apart from IBM's machine. The Deskpro line is three times faster than the IBM PC, and it has a dual-mode monitor for text and graphics, he notes. The top-of-the-line Model 4 has 640 Kbytes of RAM and a built-in tape-storage unit to back up its built-in 10-Mbyte hard disk.

To process both text and graphics and have that much RAM on a PC XT would require adaptors and memory boards that would occupy expansion slots. Users like to use these slots for other functions, such as local-area network connections, Canion asserts.

Compaq, which is trying to build on the success of its best-selling portable computer, announced four Deskpro models, ranging from a model with 128 Kbytes of RAM and a single 360-Kbyte diskette drive (\$2,495) to the Model 4 (\$7,195). Similar IBM PCs and PC XTs (without the tape backup) would cost \$2,839 and \$6,249, respectively.

The most distinctive feature of the Deskpro series is the Model 4's built-in mass-storage facility. The micro's

backup tape drive stores information on standard $\frac{1}{4}$ -inch cassettes. To get this feature on an IBM PC, you'd have to buy a separate unit.

Each Deskpro model is driven by the new 8086 microprocessor, making it twice as fast as the IBM PC, which is built around the older, slower 8088 chip. For example, Compaq claims the Deskpro will run Lotus 1-2-3 calculations twice as fast as the IBM PC. The Deskpro models also allow users to slow the machine down to take advantage of older software packages that have to run at slower speeds.

The 8086 microprocessor is also at the heart of the new AT&T personal computer, the PC 6300. AT&T says the PC 6300 will run programs 80 percent faster than the IBM PC.

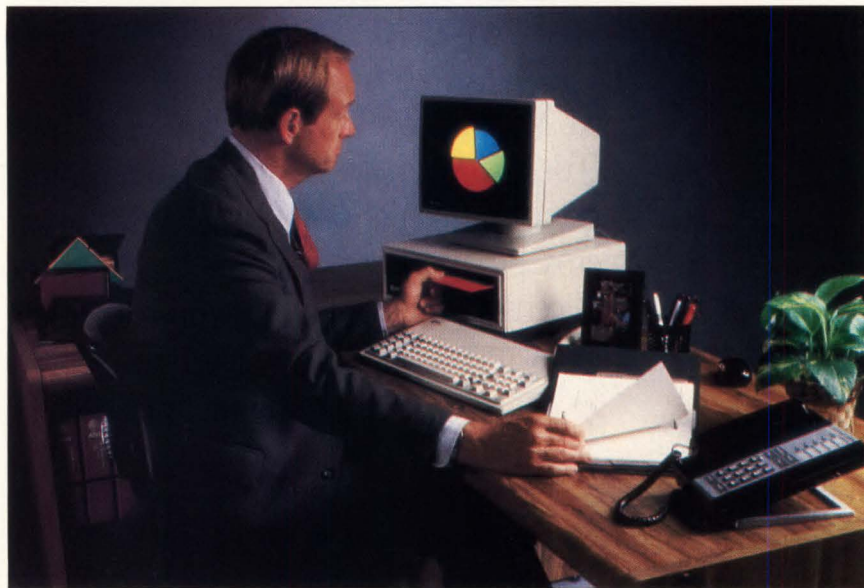
The PC 6300 is also less expensive than the IBM PC. An IBM PC with 256 Kbytes of memory, dual floppy-disk drives, monochrome graphics, circuit board, and monitor costs \$3,300. An equivalent PC 6300 costs about \$300 less.

Many observers consider the PC 6300 an interim machine because it is manufactured in Europe by Olivetti. AT&T has not picked up an option to start manufacturing the machine in this country, they note. AT&T is thought to be concentrating its development efforts on a 32-bit Unix-based personal computer. The PC 6300, like the IBM PC, is a 16-bit machine.

The PC 6300 can be networked with AT&T's larger Unix-based 3B2/300 desk-top "supermicro," which is now available to end users. Using AT&T's PC Interface, users of the PC 6300 can upload information to the supermicro. Several users working on PC 6300s can also use the more powerful machine as a shared storage facility. The PC Interface is a \$500 piece of software for the 3B2/300 and a \$100 software package for each PC 6300.

The PC 6300 is available in two models: one with two half-height 360-Kbyte floppy-disk drives and 128 Kbytes of RAM, and a second with one floppy drive, a 10-Mbyte hard

(News continued on page 26)



AT&T's new PC 6300 offers IBM PC compatibility and high processing speeds for a slightly lower cost.

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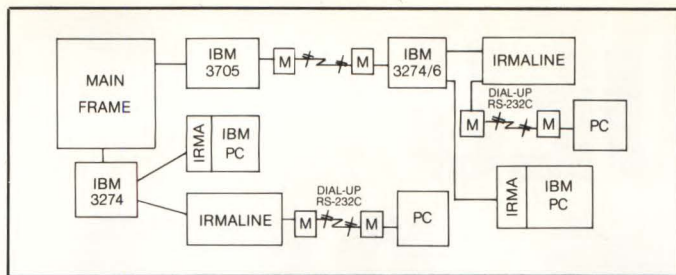
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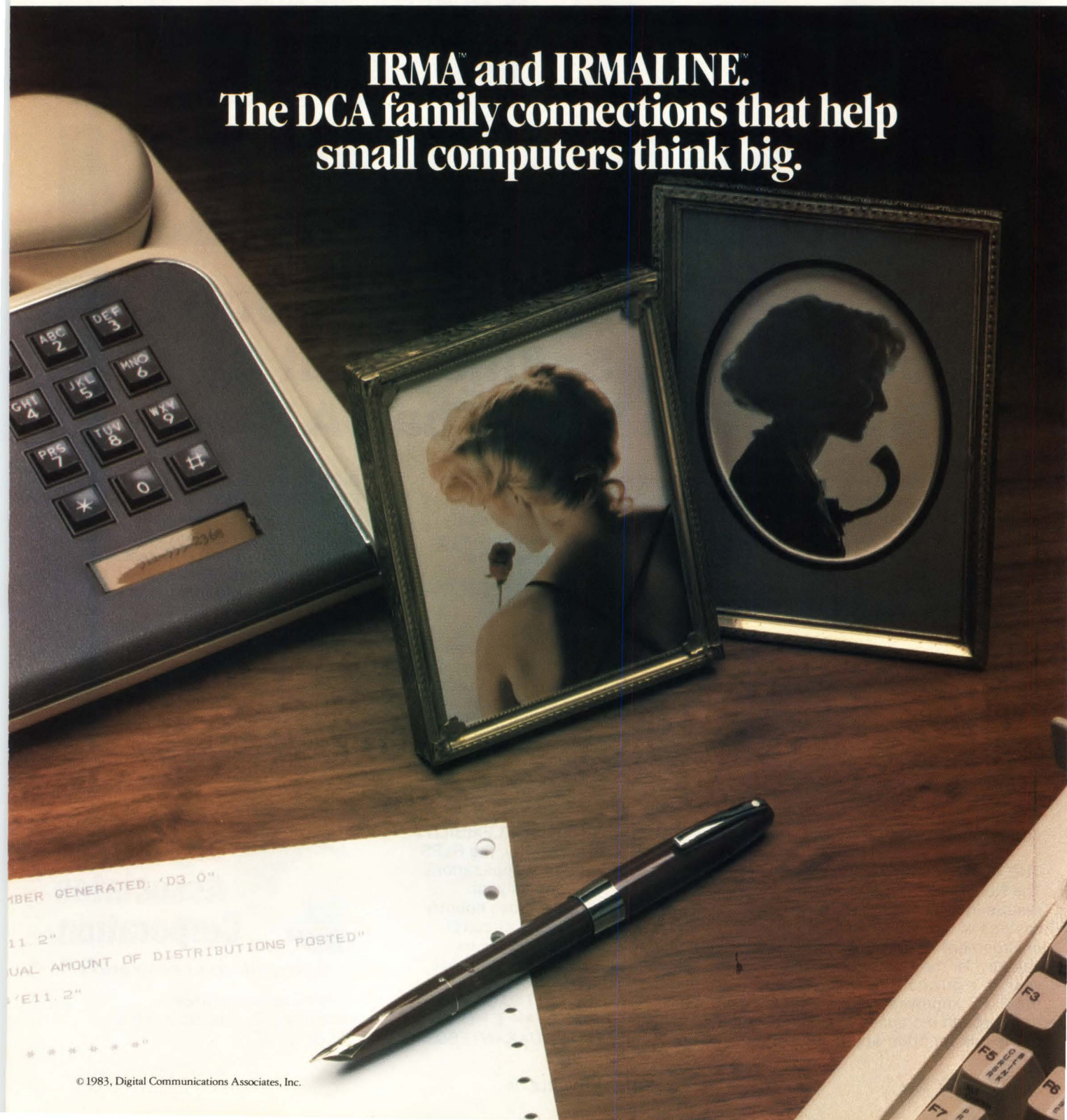
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NEWS & COMMENT

(Continued from page 22)

disk, and 256 Kbytes of RAM. For more information on AT&T's new micros call (201) 898-8326. For more information about the new Compaq models, call (713) 370-7040.

Missing links?

Like Dr. Doolittle, who was able to talk to the animals, more and more vendors are offering links they claim will allow different species of computers to talk to one another.

New offerings include the Any "data bridge" from Cipherlink, a software package that acts as a data translator. The software lets users transfer information stored in databases and applications programs between incompatible computers. The Information Server, from Linkware of Waltham, MA, allows several personal computers to capture online

data from IBM mainframes running under the VM/CMS operating system.

Cipherlink is a startup outfit based in Los Angeles. The Any data bridge runs on a separate processor that acts as an intermediary in transfers of data between two computers. A terminal user wanting to tap data stored in an incompatible host accesses Any. Working at his or her terminal, the user then sets up a model to show Any how to access information stored in an application on the target computer. The Any data bridge automatically extracts the data and reformats them for the user's host. Eric S. Lesin, Cipherlink's president, believes the data-modeling step in the procedure is easy for nontechnical users to learn.

The Any data bridge costs \$15,000, including an IBM PC XT, installation, and training. However, you may need additional equipment to run the product. Because Any's basic protocol

is async, users with terminals operating under other protocols won't be able to use Any without a protocol converter. Users working at personal computers will need a special terminal-emulation interface card.

If you don't want to install Any, Cipherlink offers an Any Master Network Bridge, which allows users to dial up Cipherlink via Telenet, the public telephone network, or a value-added network. The service costs 15 cents per Kbyte of information transferred. Transferring a half-megabyte of data would cost about \$7.50 plus connect time, Lesin says. For more information, call (213) 387-5371.

Any captures information from dissimilar databases. If you have an on-line system with information that hasn't been captured in a database or an application, Any won't be very useful. Linkware's Information Server, on the other hand, can up- and down-

(News continued on page 30)

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Record/Playback
of 96-Character Strings
for Each Window.

This enables operators to spend
more time processing data, and less
time entering ID numbers, passwords,
log-on sequences, and other frequently
used information.

LEE DATA

HOST 1: XYZ CORPORATION YEAR END 1984

DIVISION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	LONG
WEST DIVISION	492	581	487	520	518	586	510	521	498	516	488	499	6856	5.67
SOUTH DIVISION	785	697	710	782	712	788	689	708	715	706	714	8457	2.89	
EAST DIVISION	884	799	815	813	888	789	788	821	816	888	787	820	9632	3.05

HOST 2: XYZ CORPORATION PERSONNEL DATA BASE

NAME: JOHN GUNDY
ADDRESS: 2445 WEST 50TH STREET
CITY: EDEN PRAIRIE
STATE: MINNESOTA
ZIP: 55344
HOME PHONE: (612) 429-0388
START DATE: MARCH 18, 1988

NAME: SANDY REDDING
ADDRESS: 5687 OAK ROAD
CITY: MINNETONKA
STATE: MINNESOTA

HOST 3: WELCOME TO THE SOURCE
DATE: 04/23/84 TIME: 15:07:32

HOST 4: DOW JONES NEWS/RETRIEVAL WORLD REPORT
FRONT PAGE AT 3:07 P.M. MONDAY

PRESS FOR:
1. CHALLENGER BLASTS OFF TO START 5-DAY, 2-MILLION-MILE MISSION
2. MOSCOW REBUDES U.S. FOR REACTION TO REJECTION OF MISSILE PL

Lee Data has been delivering "the wave of the future"
displays for more than three years. The Lee Data 1221

Individual Windows
can Zoom to Full Screen.
In any of 4 Standard
IBM Screen Sizes.

24 lines x 80 columns, 32 lines
x 80 columns, 43 lines x 80 columns,
27 lines x 132 columns. (IBM 3180/
3278, Models 2-5.)
(Shown: The Source, a remote
Async information database.)

Data can be copied
from Window to Window.

With a simple keyboard sequence,
operators can transfer information
from session to session, host to host,
IBM to non-IBM. In any combination.
Another industry first.
(Shown: Dow Jones, a remote
Async information service for executive
and investment decision makers.)

Status Line displays
status of Window
being accessed.

New, Low-Profile Keyboards.
124 or 122 keys. This new,
low-profile keyboard will be available
in October.

Introducing the Lee Data 1221 Open Window Display. The "No PC" Approach to Windowing.

Lee Data is your passport to MORE
LEEWAY™ in planning the growth of your
information system.

The Lee Data family of displays, controllers,
printers, IBM-compatible personal computers,
and Coax Eliminators gets you across borders that
used to stop you cold. Or slow you down because
of high cost.

In October, the Lee Data Open Window™

Display will open new windows between IBM
and the rest of the world. Without requiring the
purchase of PC's you may not need.

But you don't have to wait until October to
benefit from IBM, Async, and 4 IBM screen
sizes on one display.

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Display right now. Then, in October, we can
upgrade it to the Lee Data Open Window™
Display. In minutes. Right in your office.

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MORE LEEWAY™ in crossing the borders you
face today. And the new borders you'll
face tomorrow.

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write to: Marketing Services, Lee Data Corporation,
7075 Flying Cloud Drive, Eden Prairie, Minnesota 55344

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CIRCLE 16



Herbie Briggs has just destroyed the myth that all floppy discs are created equal.

They seem equal. Until you look at the seams.

That's where equality ends.

Most companies seal their discs with a spot here, a spot there. Leaving most of each seam not sealed at all.

Sooner or later, the seams might do what comes naturally: they bulge. Warp. Pucker. Open up.

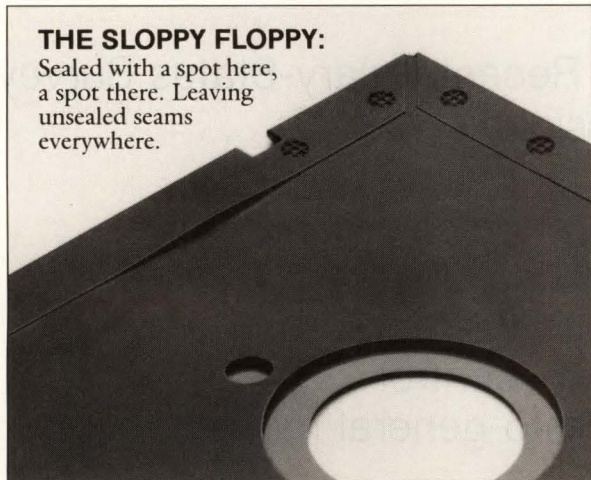
Pens, pencils, fingernails—even a four-year-old's, like Herbie—can catch and snag in those wide open spaces.

That's sloppy. And dangerous. Because if you put a sloppy floppy into your disc drive, it can jam your drive. Ruin your drive head. Lose your data.

So much for their seams. Ours are different.

THE SLOPPY FLOPPY:

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Memorex uses a process we developed, called Solid-Seam Bonding.

Solid-Seam Bonding seals shut every inch of every seam of every Memorex® floppy disc. Tight as a drum. That makes the Memorex

floppy stiffer. Stronger. And your data safer.

To resist bulging, warping, puckering, or opening up.

MEMOREX SOLID-SEAM BONDING:

Every inch of every seam is sealed shut. Tight as a drum.



To resist all the things that can jam your drive, ruin your drive head, or lose your data.

Which proves that a Memorex floppy disc isn't equal to all the others. It's better.

Solid-Seam Bonding is just one example of the extra care that goes into every Memorex floppy disc. Be it 8" 5¼" or the new 3½" Extra care that lets us guarantee every Memorex disc to be 100% error-free.

The next time you're buying a floppy disc—or a few hundred of them—just remember this:

It's always better to be safe than sloppy.

For more information on the full line of Memorex quality computer media products, including computer tape, call toll-free: 800-222-1150. In Alaska and Hawaii call collect: 408-987-2961.



Your Data. When it matters, make it Memorex.™

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NEWS & COMMENT

(Continued from page 26)

load online data from mainframes running under VM/CMS to IBM-compatible personal computers, the Digital Equipment Corp. Rainbow, and Lee Data personal computers under the MS-DOS or CP/M-86 microcomputer operating systems.

The Information Server comprises two software modules that capture online data from the mainframe. This software acts as a staging area for information on the mainframe and controls the release of online data by matching files to user-identification codes for security clearance. The security provision is unique, Linkware claims. The only other way to secure data under the same operating system is to capture them in a database or application. The software also provides an audit trail for supervisors to see which users are looking at which data.

To use information captured from the mainframe in spreadsheets and

other micro applications, users also need a Linkware micro software package. The mainframe modules cost \$25,000; the micro packages cost between \$200 and \$350. For more information, call (617) 894-9330.

Beware pitfalls of micro wp

When selecting personal-computer word-processing packages, managers should focus on features, functions, and benefits. Disregard such buzzwords as *software generation*, advises Data Decisions, a Cherry Hill, NJ-based research house that recently completed a survey of 47 word-processing packages from 45 vendors.

What are the pitfalls of purchasing word-processing packages? According to Data Decisions, managers should avoid packages that emphasize

case of use at the expense of advanced features. "Cute" or unconventional designs should also be shunned. Such packages can create problems later when users are unable to exchange files between incompatible products.

According to Data Decisions, corporate managers should look for the following features:

- Text windows and multiple-document support.
- Entries for both editing and system commands.
- Formatting and reformatting capabilities.
- Support for foreign ASCII files.
- Programming and text-editing capabilities.
- Facilities to make backup copies of floppy disks and the ability to use the program with a hard disk.

The survey provides a brief description of each word-processing package, including an overview of each product, the product type, the hardware/



In *Computer Decisions* Most Recent Salary-Status Survey Our MIS/dp Professionals Told Us . . .

- 58% would move to another organization for greater challenge
- 46% would change jobs for more autonomy, authority, or control
- 42% would like to move into general management

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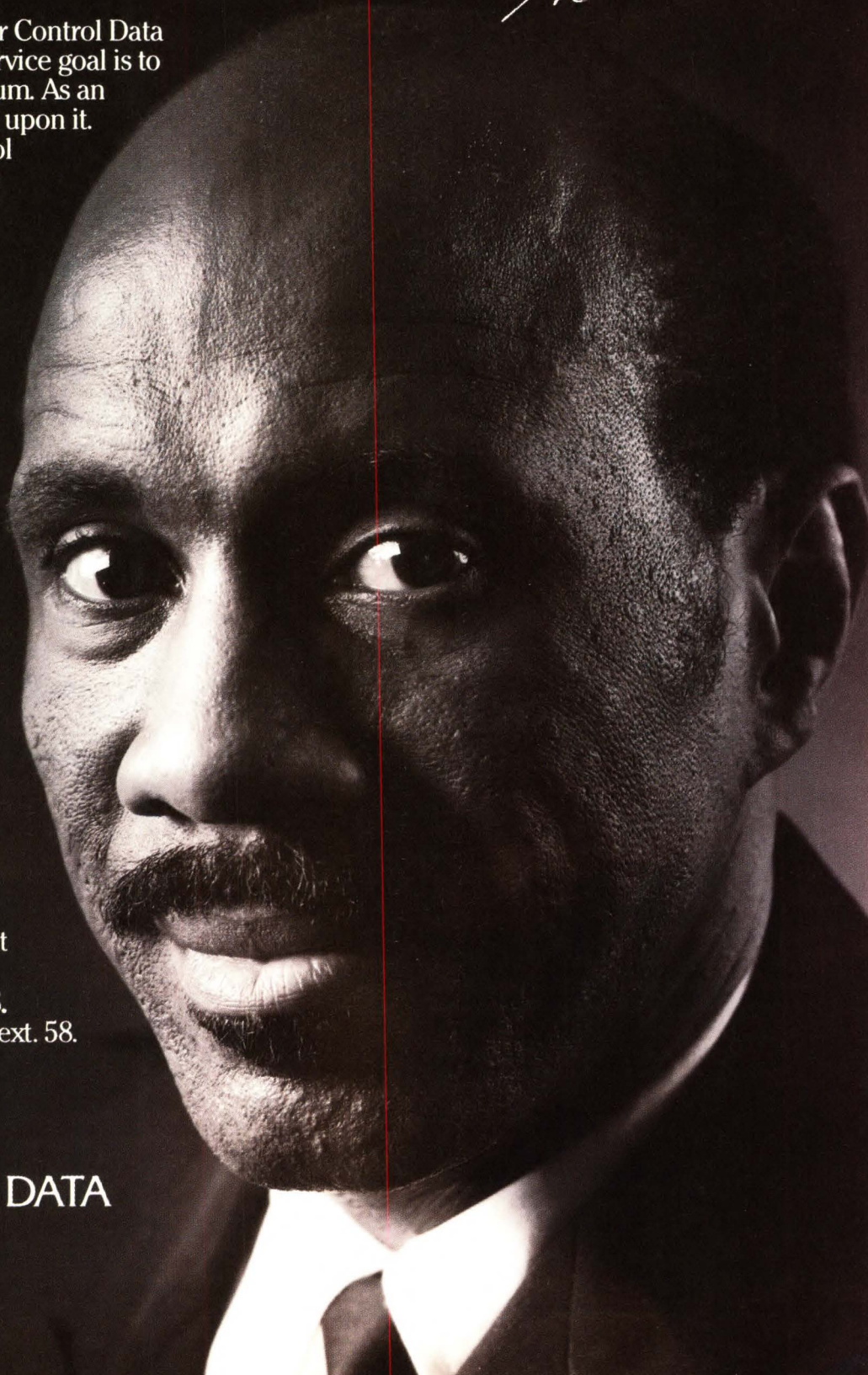
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Outside the U.S. call your local office.

 **CONTROL DATA**

CIRCLE 18



NEWS & COMMENT

software required to use it, help facilities, extra features, the printers supported, and retail price. A quick-reference chart lets readers compare software packages at a glance. "Microcomputer Word Processors," a report on the survey, is available for \$29 from Data Decisions. For information, call (609) 429-7100.

A mouse that listens?

Albert L. Whetstone, a 58-year-old former physics professor, claims to have invented a better mouse—one he says will soon be crawling onto the desktops of corporate America.

Currently, a microcomputer "mouse" operates in one of two ways: A mechanical mouse has small rollers on the bottom that help determine the direction and speed of a cursor on a crt. An optical mouse requires recognition patterns on a special surface to do the same. Whetstone claims both types can easily be contaminated by dirt and can only be used on a



limited number of surfaces.

Whetstone's invention, the HiFi Mouse, runs by sound. It has a "microphone" that senses direction by measuring the sound the mouse makes as it drags across a surface in front of a crt. A microprocessor inside the mouse compiles speed, distance, and directional information.

The microprocessor makes Whetstone's mouse smart; it can be programmed to do up to seven functions. For instance, it can indicate the starting and stopping points on a line, mark a desired position, or generate various kinds of lines—dotted, dashed, or solid, Whetstone says.

The suede bottom of the HiFi Mouse is completely enclosed, preventing dirt from messing up the

works, Whetstone says. This mouse can be used on any surface commonly encountered in computer use, such as wooden desktops, paper, and even glass, according to Whetstone.

The HiFi Mouse is manufactured by Whetstone's Display Interface Corp., Milford, CT. It is being sold to personal-computer manufacturers and OEMs and will soon be available under various labels to users. For further information, call the vendor at (203) 877-7661.

Keyboard news

S hhhh! The noise of computer keyboards could be annoying data-entry workers and affecting their productivity, claims Micro Switch, Honeywell's keyboard division. At the National Computer Conference in Las Vegas, a Micro Switch spokesman claimed that as the day wears on, the constant clatter of keyboards bothers workers.

Micro Switch's answer? The Silent-Tactile series of keyboards, which will be used by Honeywell in its

(News continued on page 39)

Tongue in check

The number of users in the computer community who utilize the multiplicity of polysyllabic replacements for less-complex words is proliferating by an order of magnitude. (Translation: More and more folks who work with computers are replacing plain English with big-sounding words.)

Computers are very complex machines, but many of the tasks they do are simple and straightforward. Unfortunately, vendors, managers, and users alike often describe their machines, software, peripherals, and even themselves, with highfalutin words and phrases. These words seem to be appealing because they are long: *a multiplicity of* sounds so much more sophisticated than *many*. Unfortunately, although these words lengthen a sentence, they don't contribute to its depth of meaning. Such words create sentences that take the speaker's breath away and leave the listener confused.

For example, a new computer isn't worth its salt if it isn't described as having *a multiplicity of functions*. That means the machine can do many things; it is versatile. In his day, Willie Mays, the Hall of Fame baseball player, was also considered versatile. Imagine

sportscasters describing him as possessing *a multiplicity of talents*.

In the same way, *use* is a simple, clear substitute for *utilize*. Another polysyllabic favorite is *configuration*, a noun used to describe the arrangement of parts in a computer system. How about *setup* instead? *Spread* is the real meaning of the ever-popular *proliferation*. And *group* (or nothing at all) is much more succinct than *community* or *population*.

Unnecessarily long words are a trap. They sound more authoritative and sophisticated, but it's all an illusion. A mouthful of syllables doesn't raise the stature of a simple statement; it only obscures its meaning. The consequences for you can be significant, particularly if you use these pretentious words around the boss. Executives don't have time to translate what you're saying. They want the message free and clear.

Computer professionals have a reputation for being confusing. In fairness, the subjects they deal with can be very confusing to nontechnical colleagues. Direct, unadorned statements will help you get your message across. They may even help put your career in *an enhancement mode*.

—John Rymer

NEWS & COMMENT

(Continued from page 32)

future computers. The keyboard made its debut last month at NCC. Micro Switch has replaced the springs that cushion the impact of the keys on most keyboards with rubber boots that eliminate the contact between the key plunger and the keyboard housing. Micro Switch is the first keyboard manufacturer to introduce this anti-noise design, said the spokesman. Other keyboard makers will be watching to see if users really do care about keyboard noise, said a representative of another keyboard maker at NCC. For further information about the Silent-Tactile keyboard, call (815) 235-5731.

Beware of crafty headhunters

Unethical headhunters are using the "salary survey" ploy again to gather the names of dp professionals.

A reader has informed us that "Bob Johnson," who claimed to be an employee of *Computer Decisions*, called recently seeking the names of the company's programmers. The caller claimed to be conducting a salary and status survey. Suspicious, the manager who was called asked "Johnson" to submit his request on *Computer Decisions* stationery. The caller never responded.

This is to advise all subscribers and readers that *Computer Decisions* is not gathering information on the salaries and status of programmers or other dp professionals by phone. Be wary of the other ploys used by unscrupulous headhunters to acquire the names of professionals. The "free-subscription" ploy is so shopworn that we hope no reader will fall for it. *Computer Decisions* solicits subscriptions only by mail, and to our knowledge, every other computer publication operates the same way. We don't employ anyone named Bob Johnson. If anyone calls claiming to work for this magazine, consult the masthead in the front of each issue to check his or her name and position.

But do they do windows?

Cleaning up the dust, dirt, debris, and paper in your data center is a job for professionals, not just anyone with a mop. That's the message from Data Clean, a computer-center cleaning service that promises to get into those hard-to-reach places that your building's maintenance staff might miss.

"An ordinary maintenance staff does not have the expertise to clean a data center," says Data Clean's owner, Phil Bertino. "As a result, most data centers never get cleaned. We do a thorough job." Data Clean professionals will vacuum under hardware and enclosed areas, and between floors and equipment, Bertino says.

"By cleaning under floors you protect against false fire alarms and fires," explains Bertino. The fire- and smoke-detecting equipment in most data centers is extremely sensitive to dust, he explains. If too much dust accumulates, the equipment sounds the alarm, and may discharge Halon, the fire-extinguishing gas, throughout the data center. Cleaning enclosed areas prevents overheating due to clogged filters and air blockages, Bertino adds.



Data Clean also promises to remove ink, dirt, and toner from all hardware, from CRTs to laser printers. "Because of its toner base, IBM laser printers are the toughest of all to clean," says Bertino. "The toner gets all over the equipment. Many centers have tried using car wax to remove toner stains. This works, but it takes the paint off, too. Data Clean's finisher protects the hardware surface while it cleans."

Prices for the Data Clean service depend on the size of your dp shop, the amount of equipment, and the cleanliness of your center. Data Clean operates in New York, New Jersey, Connecticut, and Washington, D.C., and will open a branch in Los Angeles by September. For more information, call (201) 787-2564.

And yes, they do windows!

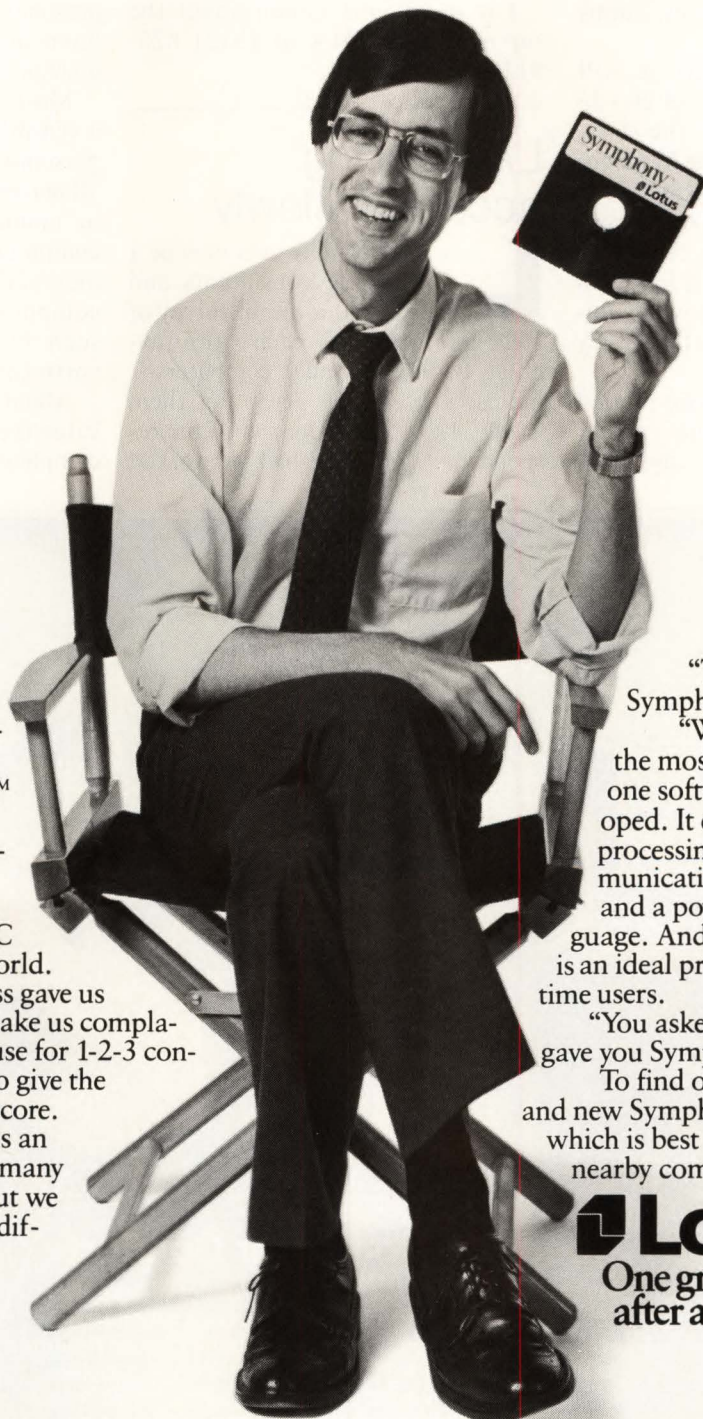
(News continued on page 42)

"You asked for an encore."



Brian Stains is the Symphony Program Manager at Lotus Development Corporation. He was previously involved with the creation of 1-2-3 software and is one of the original members of the company.

We gave you a Symphony."



"It took a dedicated team to create what the business community termed 'an overnight success.' But that's just what 1-2-3™ software became.

"When people discovered the incredible speed and power of 1-2-3, they made it the number one PC business software in the world.

"Naturally this success gave us confidence, but it didn't make us complacent. So even as the applause for 1-2-3 continued, we were working to give the business community an encore.

"We realized 1-2-3 was an analytical tool that solved many people's business needs. But we also talked to people with different requirements.

"We listened and we learned.

"The result is new Symphony™ software.

"We believe Symphony is the most comprehensive, all-in-one software system ever developed. It combines word processing, spreadsheet, communications, database, graphics, and a powerful command language. And like 1-2-3, Symphony is an ideal program even for first time users.

"You asked for an encore, we gave you Symphony."

To find out more about 1-2-3 and new Symphony software—and which is best for you—visit your nearby computer dealer.

Lotus
One great idea
after another.™

NEWS & COMMENT

(Continued from page 39)

Dp-ers want respect

Long the Rodney Dangerfields of American business, data-processing managers still feel that, like the beleaguered comedian, they are not accorded the respect their position deserves, claims a recent survey.

Dp's corporate visibility is still poor, according to a survey of 200 dp managers by *Comp-u-fax*, the newsletter of the Data Processing Management Association, Park Ridge, IL. The respondents were mainly from Fortune 1,000 companies. About 60 percent believe they're paid less than other corporate executives with similar levels of responsibility, the survey showed.

Dp managers feel they are treated as "machine manipulators" rather than corporate executives, says Aus-

tin Weber, editor of *Comp-u-fax*. In most corporations, dp is still viewed as a support function, the survey suggests.

The average MIS/dp manager surveyed has an annual salary of \$40,598 and works 47 hours a week. Most prefer to be compensated for the overtime in cash rather than vacation time.

For more information about the survey, call DPMA at (312) 825-8124.

LANs being accepted slowly

Local-area networks may be a hit among consultants and gurus, but a recent survey of 122 manufacturers—each with an average of 319 personal computers—indicates users are accepting them slowly. Less than a quarter of the respondents said they had networked

personal computers.

The survey by the Machinery and Allied Products Institute (MAPI), a Washington-based organization of financial officers of manufacturing companies, also showed that about half of the companies have formal written policies concerning control of personal computers. About 20 percent have no policies and about one-quarter have informal policies.

Most of the companies do not have a central control point for cataloging personal-computer usage. More than 70 percent do not attempt to measure or monitor the impact of personal computers on productivity. However, most of the respondents have a central equipment-acquisition policy overseen by the data-processing department, according to the survey.

About half of the companies indicated their micros were stand-alones, completely independent of other mi-

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THE PORTABLE.

For years business people had to choose between the power of a desktop computer and the limited capabilities of the first portables. That problem was solved when Hewlett-Packard introduced The Portable.

The Portable is designed with more total memory than most leading desktop personal computers...656K in fact. That includes 272K of user memory. So, The Portable's built-in business software can work with enormous amounts of data.

1-2-3™ from Lotus,™ America's most popular spreadsheet, file management and business graphics program, is permanently built into The Portable. So is Hewlett-Packard's word processing program, MemoMaker. Just press the key and you're ready to work.

The Portable even has a built-in modem and easy-to-use telecommunications software to send

or receive data using a standard telephone jack.

If you use a Hewlett-Packard Touchscreen PC, IBM® PC, XT or an IBM compatible you'll be glad to know that your desktop and The Portable can talk to each other with the simple addition of the Hewlett-Packard Portable-Desktop Link.

The Portable's rechargeable battery gives you 16 hours of continuous usage on every charge.

Finally, you can work comfortably on a full size keyboard and an easy-to-read 16-line by 80-column screen. And it all folds shut to turn The Portable into a simple nine-pound box.

The Portable. A small miracle...perhaps. But then consider where it came from.

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NEWS & COMMENT

cross or large systems. "It seems fair to conclude that office-automation efforts are still in the beginning stages for most respondents," according to MAPI's summary. Thirty-two percent of the respondents said their per-

sonal computers are linked to a mainframe on a read-only basis. About 20 percent said they have micros that are fully integrated with a mainframe.

The majority of the MAPI members said the chief operating officers

of their companies have a limited understanding of personal computing, but none of them said the boss had opposed the introduction of micros.

Almost half of the respondents said they have no policy requiring users to back up and secure important files on personal computers. An additional 20 percent said they had such a policy, but it was not followed.

Personal computers are used mostly for spreadsheets, according to 103 of the 122 responding companies. Word-processing and statistical/technical applications were used by 71 and 73, respectively, of the responding organizations.



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Cooking up an Apple-IBM link

What do you get when you slip an Apple disk into an IBM Personal Computer? An Apple-Turnover! The Apple-Turnover, developed by Vertex Systems, is a low-cost board for the IBM PC that allows direct transfer of files between Apple and IBM 5¼-inch disks.

The board allows disks formatted under the Apple-DOS 3.3 and CP/M operating systems to be read by IBM PC disk drives. (The IBM PC runs under the PC-DOS operating system.) Individual Apple files or entire disks can be copied. In addition, blank disks can be formatted for Apple models on an IBM PC.

The Apple-Turnover comprises a half-size printed-circuit board, a disk-drive attachment cable, file-transfer software, and a test disk. The board is installed in any expansion slot between the regular disk-controller card and the IBM disk drives. An Apple test disk is provided to assure proper installation and operation.

The Apple-Turnover will run on the IBM PC, the XT, and most PC compatibles running under MS-DOS (PC-DOS) with 128K of memory and two disk drives. The price is \$280. For more information, call Vertex Systems at (213) 938-0857.

(News continued on page 50)



In 1947, 71 years after Alexander Graham Bell uttered the words "Watson, come here, I want you...", Bell Laboratories invented the transistor...and ushered in the Computer Age.

WATSON, WATCH US NOW!



AT&T INTRODUCES TH

For over 40 years, AT&T has been in the business of designing and manufacturing computers.

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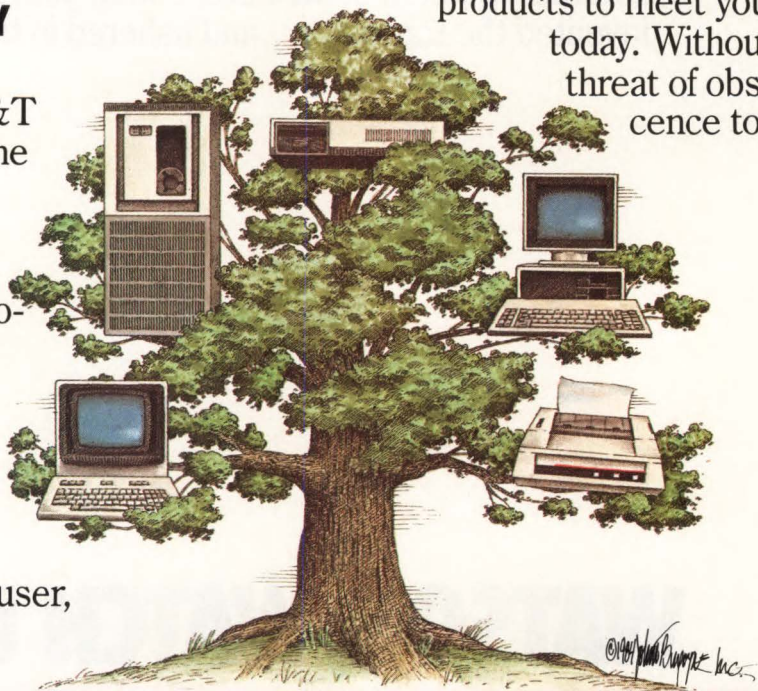
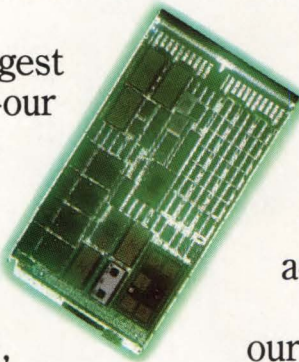
The 3B2, 3B5 and the AT&T Personal Computer make up the new AT&T family of flexible business computers.

The AT&T 3B2 is one of the most advanced super micro-computers you can buy today. This 32-bit UNIX* System V-based super micro packs all the power of a much larger system in a size small enough to sit on your desk top. Because it's a multi-user, multi-tasking computer that can accommodate up to 18

terminals, it operates at a low cost per work station. That makes it perfect for offices where many people need desk-top computers and there's a need to accommodate growth.

For larger family gatherings, the AT&T 3B5 minicomputers make great hosts, because they can accommodate up to 60 users.

What's especially attractive about our family is that it will grow with you. No matter what size your company, it allows you the flexibility to pick specific products to meet your needs today. Without the threat of obsolescence tomorrow.



E NEW COMPUTERS.

And the family's open architecture means that our computers will be good company for your current hardware and software, thus protecting your investment.

No matter which AT&T Computer you buy, consider yourself part of the family.

ALL THIS AND A PC TOO

AT&T would also like you to meet the new AT&T Personal Computer. This exciting new member of our computer clan is perhaps the most flexible and compatible personal computer on the market today.

What makes the AT&T Personal Computer special is its ability to run most popular business software, including most available MS-DOS** applications. It operates as a stand-alone unit or as an intelligent work station in an integrated computer network.

And it combines high performance with excellent graphics capabilities and a high-resolution screen.

Moreover, costly options on some other PC's are standard features on the AT&T Personal Computer—features such as color graphics; serial and parallel ports; clock/calendar display; monitor pan and tilt, plus multiple expansion slots to add extra printers, memory and other plug-in options. All this is bound to make it your personal favorite.

YES, WE DO WINDOWS

If you have several stacks of work that you'd like to spread out and work on, AT&T has the perfect way out. It's called windowing. It allows you to divide your computer screen into four miniscreens. It enables you to print from one window, edit in another, draw a graph in a third and sort addresses in the fourth. With AT&T's windowing, you'll be able to see to everything at once.

When it comes to compatibility, the new AT&T Computers hit it off with each other...and most everyone else.

To begin with, our unique PC Interface





THEY GET ALONG

bridges the MS-DOS and UNIX Operating Systems, allowing you to use your PC as part of a larger 3B network.

All our computers are based on AT&T's Information Systems Architecture, an open, communications-based structure that can accommodate and integrate not only our products, but also those of other manufacturers.

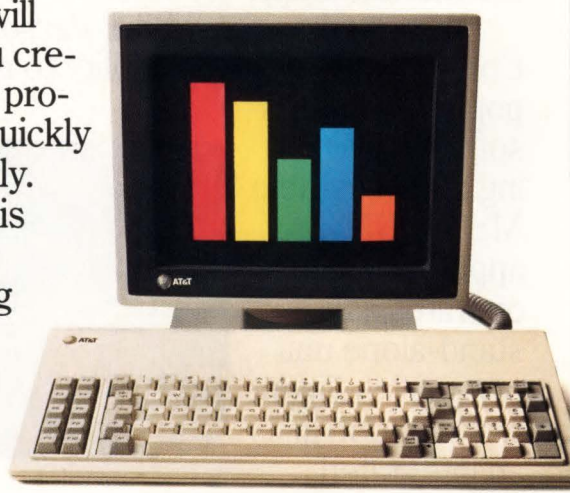
We also have the UNIX System V Operating System, developed by AT&T Bell Laboratories. It's an operating system so flexible, it's rapidly becoming an industry standard. You won't have to discard equipment. Or waste time and money re-programming every time a new computer comes along.

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The new AT&T Information Systems Network, featuring star topology, is one of the most flexible, cost-efficient links between terminals, work stations, and computers of all sizes. This local area network allows you to connect departments, whole buildings, industrial parks... or even campuses.

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news & comment

(Continued from page 44)

Fujitsu offers new micro

Expanding the frontiers of personal-computer storage capacity, Fujitsu Microelectronics Inc. exhibited a new 16-bit desk-top personal computer with a built-in 20-Mbyte hard disk at the National Computer Conference in Las Vegas. The Micro 16SX runs MS-DOS or CP/M-86 software. It comes with either a 20- or 10-Mbyte hard disk, a 360-Kbyte floppy drive and 384 Kbytes of on-board RAM. The 20-Mbyte model with a color monitor costs \$5,595. The 10-Mbyte model costs \$700 less.

Like the new micros from AT&T (New York) and Compaq Computer Corp. (Houston), Fujitsu's personal computer is powered by an 8086 microprocessor, which makes it about twice as fast as the IBM Personal Computer. One unique feature, according to a Fujitsu representative, is that this microprocessor sits on a removable board, which can be replaced as microprocessor technology advances. In other micros, the microprocessor is attached to the main assembly and cannot be replaced, the representative said. For further information, call (408) 980-0755.

A mixed review of Symphony

The new Symphony integrated software package for personal computers from Lotus Development Corp. is an excellent financial-modeling tool, but less successful as a word-processing package, according to Ferrin Corp. of San Francisco.

Symphony combines spreadsheet analysis, word processing, data management, graphics, and communications for a price of \$695.

Organizations can easily modify Symphony to be linked with large-computer resources providing powerful financial-modeling capabilities, says David Ferris, chairman of Fer-

rin, a personal-computer-support outfit. Working with Symphony's built-in asynchronous-communications capability, a programmer can build an easy-to-use format that automatically updates a financial model

without user involvement, says Ferris. This capability isn't available on Lotus' popular 1-2-3 package. Rather, the user has to pull the information off databases in other computers, Ferris says.

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Symphony is good for writing memos and outlines, Ferris says, but it is not suitable for long reports and formal documents because its word-processing commands are unwieldy and time-consuming. For example,

Symphony won't automatically hyphenate and justify text. The user has to input a command at the beginning of each paragraph to justify copy, he says.

Lotus responds that Symphony is a

word-processing tool for professionals, not a powerful word-processing package. Symphony's word-processing facility can handle documents as long as 150 pages, Lotus claims. "We have two people using it for their doctoral theses," says Marv Goldschmitt, vice president of business development for Lotus. Moreover, Lotus claims that automatic justification would slow the package, making it less responsive to user demands.

For more information, call the Cambridge, MA-based software company at (617) 494-1270.

Mainframe power on a mini?

The trend toward decentralized computing continues with Canaan Computer Corp.'s Model 5400. According to Canaan, the 5400 minicomputer packs the power of an IBM mainframe running under the VM/CMS operating system. The 5400 can support up to four users and costs \$85,000.

VM/CMS is IBM's friendliest and most efficient operating system and is most often used for program development, decision support, and database management. It is currently available on IBM's 4300 mainframe or XT-370 micro. Canaan claims to offer a middle ground: a powerful minicomputer that can be installed right in an office. Canaan (Trumbull, CT) claims that the 5400 runs at least 26 popular software products, including Focus (Information Builders Inc.), Ramis II (Mathematica Products Group), Adabas (Software AG), and SAS (SAS Institute). Because the products run on a minicomputer, they are far less expensive than the same packages that run on the mainframes.

The 32-bit 5400 system supports up to 4 Mbytes of main memory, 16 Mbytes of virtual memory, and up to 170 Mbytes of Winchester disk storage. Call (203) 372-8100 for more information.



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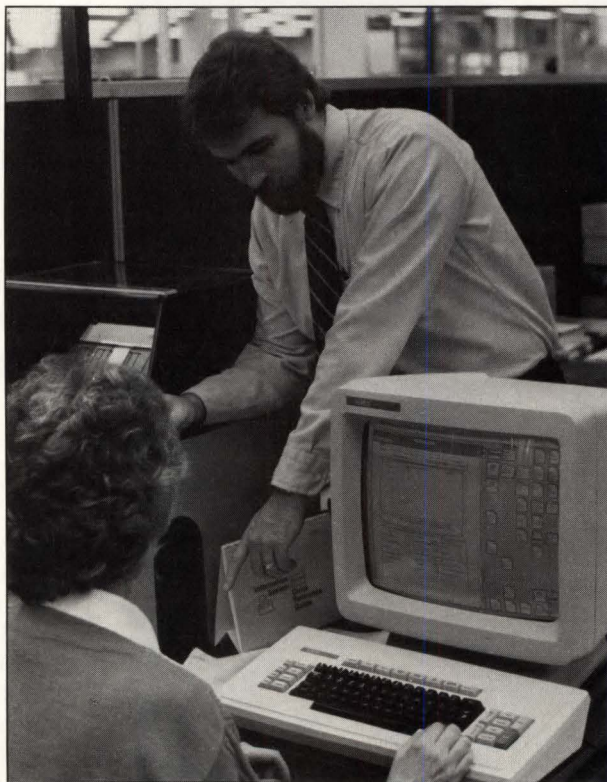
Ethernet speeds documents

When Allen-Bradley Co.'s Milwaukee-based industrial-control division installed its Xerox Ethernet local-communications network, it hoped to gain a savings of \$90,000 per year. In one year, the company overshot its goal with a savings of \$107,000. There was an added bonus when turnaround time on document-production projects dropped more than 20 percent.

Allen-Bradley's Xerox Ethernet communications network links 11 Xerox 8010 Star professional workstations, two Xerox 860 information-processing systems, five Xerox 16/8 personal computers, two Xerox 29-byte file servers, one 42-byte file server for mass storage of data, and two Xerox Model 8044 laser printers that print either vertically or horizontally at a rate of 3,000 words per minute. After documents are readied by staffers at workstations, the laser printers provide camera-ready copy in seconds.

The Ethernet network uses a coaxial cable to connect the various units, allowing information to be sent from one device to another at speeds of up to 500 pages (10 million bits) per second. An important feature of the network system is the link between the employees that prepare documents and the company's IBM 3081 mainframe.

The MIS department uses a Xerox 8010 Star information system to directly process transferred information. This system eliminates the time-



Thomas Conley, MIS manager, gives secretary Mary Joan Kieliszewski instructions as she edits data from an IBM mainframe in order to prepare a finished document on the Xerox 8010 information system.

consuming process of writing hard copy, typing a document into a computer, and making a printout. Charts and graphs generated on the 8010 can be added to documents. When document workup is complete, the camera-ready copy, set in any type and style, is printed in seconds via a Xerox laser printer.

By May of 1982, the Ethernet network had been installed in six departments in the industrial-control division. "We extract information developed on the mainframe by the systems analysts and programmers using the 8010, and then produce the finished document on the laser print-

er," says Thomas Conley, management-information systems manager. "The documentation is distributed among the 400 terminal operators, who eliminate errors. In some cases, we've taken two weeks' worth of typing and trimmed it down to a day's worth of data."

The marketing-communications and development-engineering service departments develop technical publications such as data sheets, user manuals, and instruction sheets. William Koch, systems and procedures manager, explains, "In the past, none of the departments had word-processing systems, or any real office-automation systems. Our technical writers would write their product pieces in long-hand and submit their work to the secretarial staff. After the material was typed, it was reduced to size, pasted next to the graphics and taken to the art department, where it was redone and typeset by an outside typesetting service."

The 8010 workstation allows technical writers to develop the entire publication quickly and directly onto the system. When the writers enter text, their work is properly sized on the display screens in its final form. Standardized formats can be stored in the 8010 so writers can have the exact format, spacing, type sizes and styles, all at their fingertips.

The Xerox 8010 Star information system costs \$9,995. The Xerox laser printer is \$29,500. For more information, contact your local Xerox sales office. *Circle 591*

Bob Whatsisname
in Accounting.
He's into computers.
Yours.



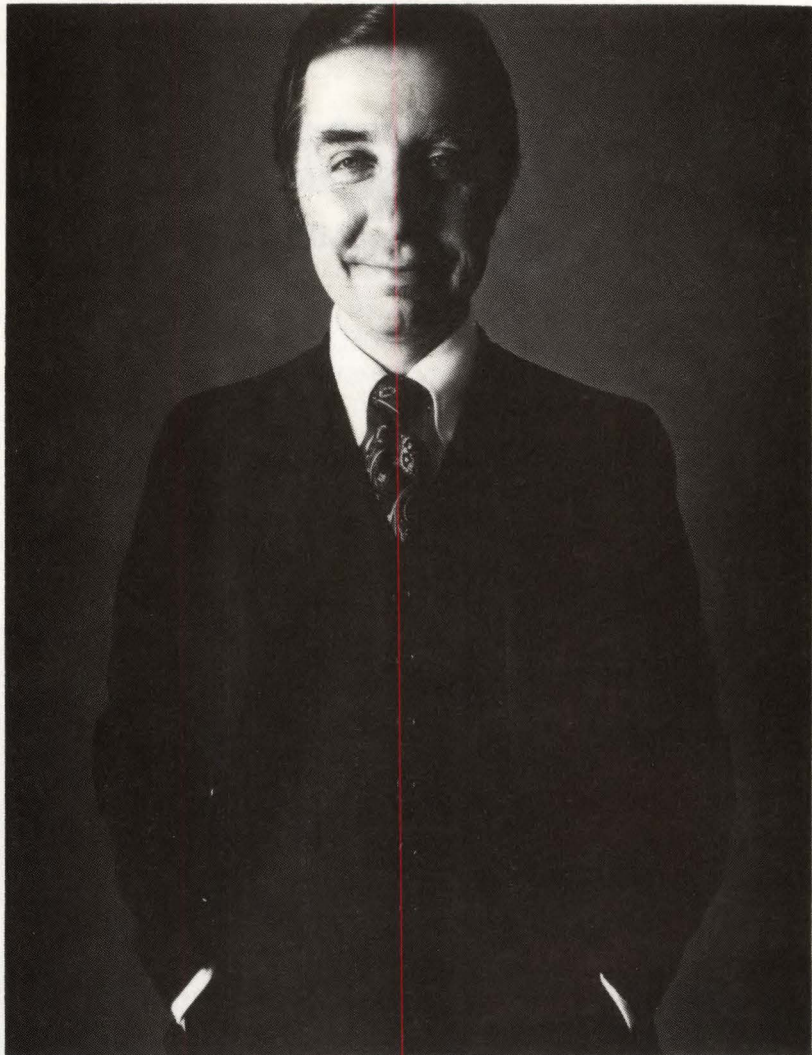
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provides for the only true staged implementation to ease you into a comprehensive security program. You can protect your most critical data immediately and secure the rest in stages without ever affecting your day-to-day operations.

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It gives you exactly what

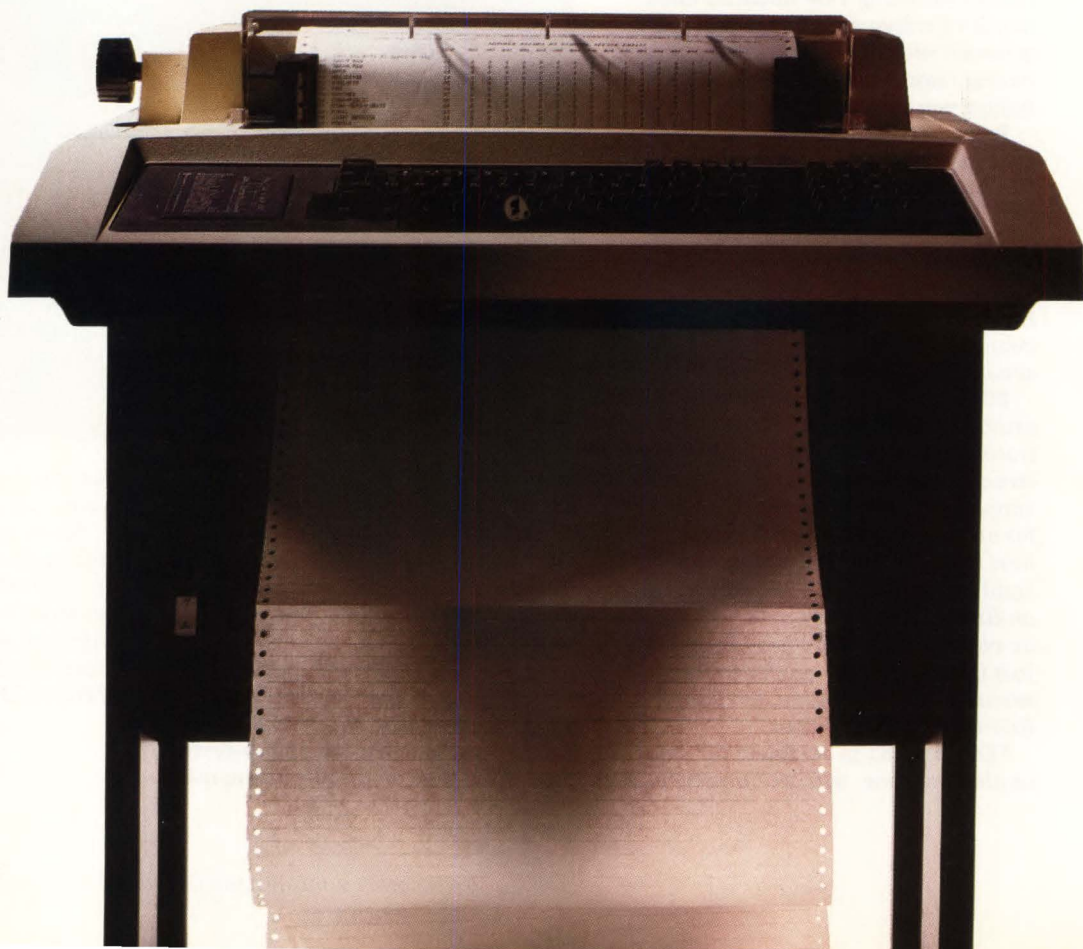
you want. Fast draft speed printing at 180 characters per second. Fanfold paper capabilities in widths up to 15". A choice of 8 character widths. And extensive communications support, including auto answerback and auto disconnect.

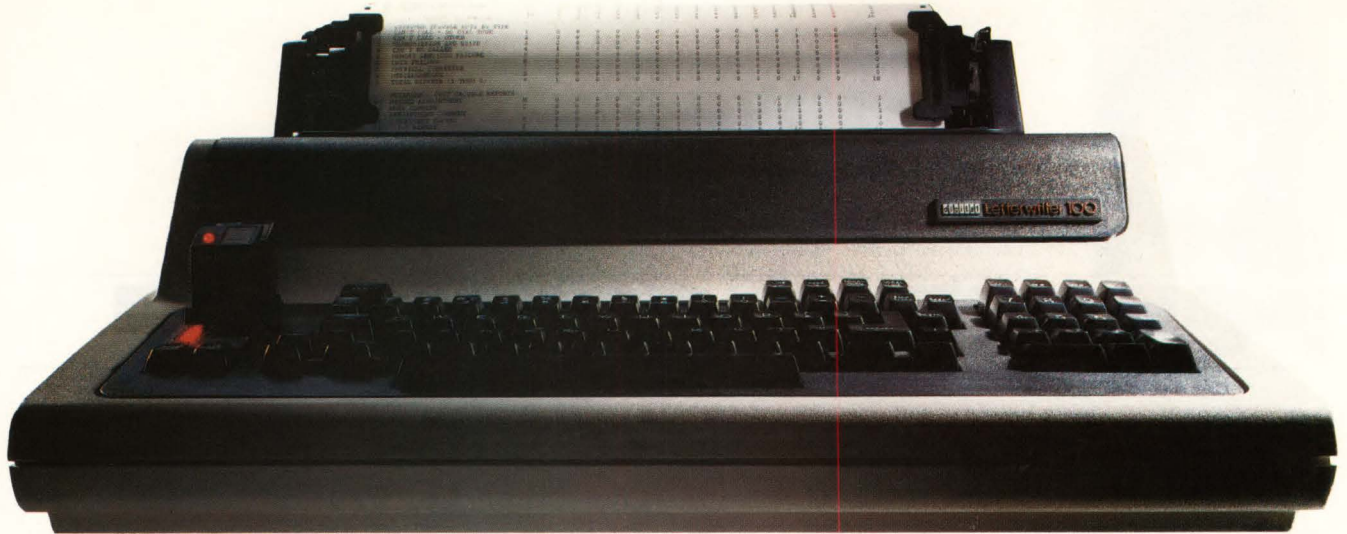
Most importantly, the DECwriter III teleprinter is a true master of forms. Some 45 features, like horizontal pitch, left/right and top/bottom margins, as well as horizontal and vertical tabs, are all summarized right on the keyboard, allowing you to set up formats in an unusually quick and sim-

ple manner. Then, once set, all can be stored in non-volatile memory. And the DECwriter III teleprinter can provide crisp, legible forms up to an impressive 6 parts.

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Flexibility is the word that best describes the Letterwriter 100™ teleprinter. For starters, you have a choice of multiple print speeds. You can print a draft copy of a one page proposal in just 10 seconds. Then,





by simply pressing a single button, you can shift from a high speed 240 characters per second to a high quality 30 characters per second, with printing that's difficult to distinguish from true letter quality. There's even an optional 80 character per second memo mode that's ideal for interoffice correspondence.

For further versatility, the Letterwriter 100 teleprinter lets you select from 8 different character widths, multiple character sets and a wide variety of typefaces. In fact, you can store 5 different typefaces resident within the teleprinter, and the selection can include Courier 10, 12, and Italics, Gothic 10 and 12, Orator 10, and APL, so you can select the style that suits the job as easily as pressing a key. And, in the event you'd like to illustrate a particular point, bit map graphics help you do just that.

The Letterwriter 100 can handle the paper that best suits your needs. Sheet, fanfold or roll, in any width up to 15".

Finally, the Letterwriter 100 product tackles all your forms. Setup is simple, and the high quality dot matrix printhead provides crisp, legible copies through 4 part forms.

In short, the Letterwriter 100

is the one teleprinter that finally lives up to the requirements of your whole office.

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output that won't fade over time like thermal paper. It also gives you the flexibility to print multiple part forms and labels. And you may customize the text output to your own particular style by selecting from a wide variety of character sets, widths and sizes alone or in conjunction with bit map graphics.

But what makes the Correspondent teleprinter truly impressive is that you get all these features in a compact little 20-pound package. A package complete with three communications interfaces. Not just the usual RS232-C port, but a 300 baud acoustic coupler and a 300/1200 baud modem as well. That means the Correspondent teleprinter

can function as a console or as a transportable terminal that can move from desk to desk or office to office, ready to communicate in whatever mode is available.

No matter how you look at it, the Correspondent teleprinter gives you a lot of capability in a small package.

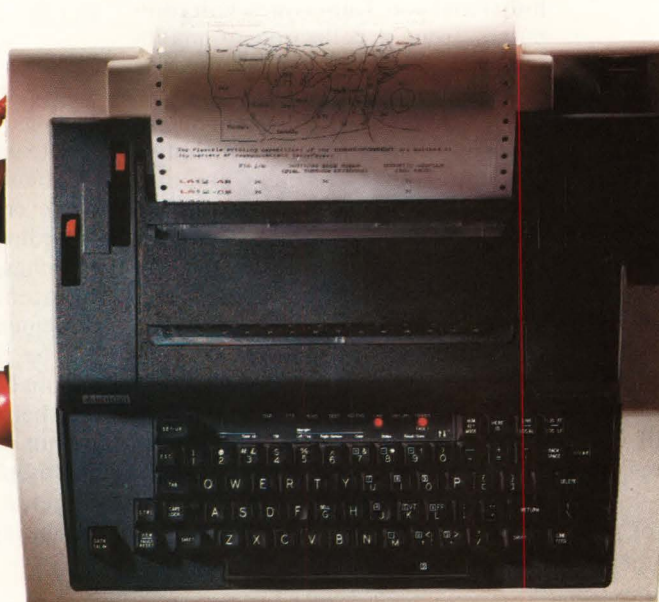
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by Susan Foster Bryant, Microsystems Editor

PERSONAL COMPUTING

What to do when the chips are down

Great Western Life Assurance Co. has more than 50 personal computers in its Denver headquarters, but, so far, only one personal-computer nightmare: printer breakdowns. Printers and disk drives are the most used, misused, and abused microsystem components. But whether the printer, the drive, the monitor, or the cpu breaks down, the effect is the same—work stops.

Managers must ensure that microsystems are fixed promptly when they break down. As more and more employees come to depend on their personal computers to complete both major and minor tasks, managers are clamoring for fast, reliable service.

A service contract from Computerland for one IBM PC costs about 10 percent of the machine's purchase price.

Where there's a need, there's a market—third-party service companies promise to keep your systems up and running. TRW (Fairfield, NJ), Americare Service, a division of Xerox Corp. (Stamford, CT), Sorbus Systems (Frazer, PA), Honeywell Inc. (Minneapolis), Bell & Howell Service Co. (Chicago), RCA Service Co. (Cherry Hill, NJ), Western Union Corp. (Upper Saddle River, NJ), ITT Corp. (New York), and Bunker Ramo Information Systems (Trumbull, CT) are some of the larger companies that provide third-party service.

For managers whose micros are confined to a single region, a smaller

service company might be the best option. New York-based Computer Doctors, Serviceland Inc. of Westlake Village, CA, Computer Repair Corp. of Sunnyvale, CA, and Littleton, MA-based Indeserv (recently acquired by First Data Resources Inc., an Omaha, NE-based division of American Express Co.) are examples.

"Until now, most users returned broken machines to the retailer they purchased them from," says Paul Currin, president of Computer Repair Corp. "Unfortunately, most retailers offer only limited repair services. Thus, users often had to lug the equipment to a repair center or back to the manufacturer. This results in turnaround time measured in weeks, not days or hours." Many third-party service companies, in contrast, take the equipment in, repair it, and have it on its way back to the user in two hours.

Service is a big issue for corporations with micros purchased from hither and yon. Companies with computers from a collection of manufacturers need independent service organizations. Xerox, for example, services more than 33 different micros made by 15 manufacturers, including the bankrupt Osborne Computer Corp. In fact, although they shake consumer confidence, bankruptcies contribute to the need for third-party service. Xerox' Americare Service bought Osborne's stock of spare parts when the portables-maker went under.

Of course, corporations that installed IBM Personal Computers have an easier time with maintenance. One of the attractions of the IBM Personal Computer is the perception on the part of users that Big Blue will

faithfully repair its own equipment. IBM services about 30 percent of the PCs it sells under contract.

Inevitable goofs

Microcomputers are not idiot-proof. They will not continue to give maximum performance if, for example, they are left on 24 hours a day or an employee spills coffee on them. Pepsi residue on a disk or ketchup ooze inside the crt won't raise productivity, either. Stories about ketchup aren't far-fetched: Someone at BMD Corp., McLean, VA, actually spilled ketchup inside a micro.

Of course, setting common-sense guidelines for employees will help

Companies with personal computers from a collection of vendors need independent service organizations.

reduce the number of accidents involving micros. Computers are neither toasters nor tables, and employees shouldn't eat or drink near them. However, no matter how good your procedures and how frequent your warnings, accidents will happen. A maintenance contract or similar agreement will ensure that problems will be repaired promptly and with minimal impact on your operation.

Other causes of micro breakdowns are not so dramatic. At the Sisters of St. Joseph of Orange Hospital in Los Angeles, micros suddenly began presenting users with strange charac-

(Continued on page 60)

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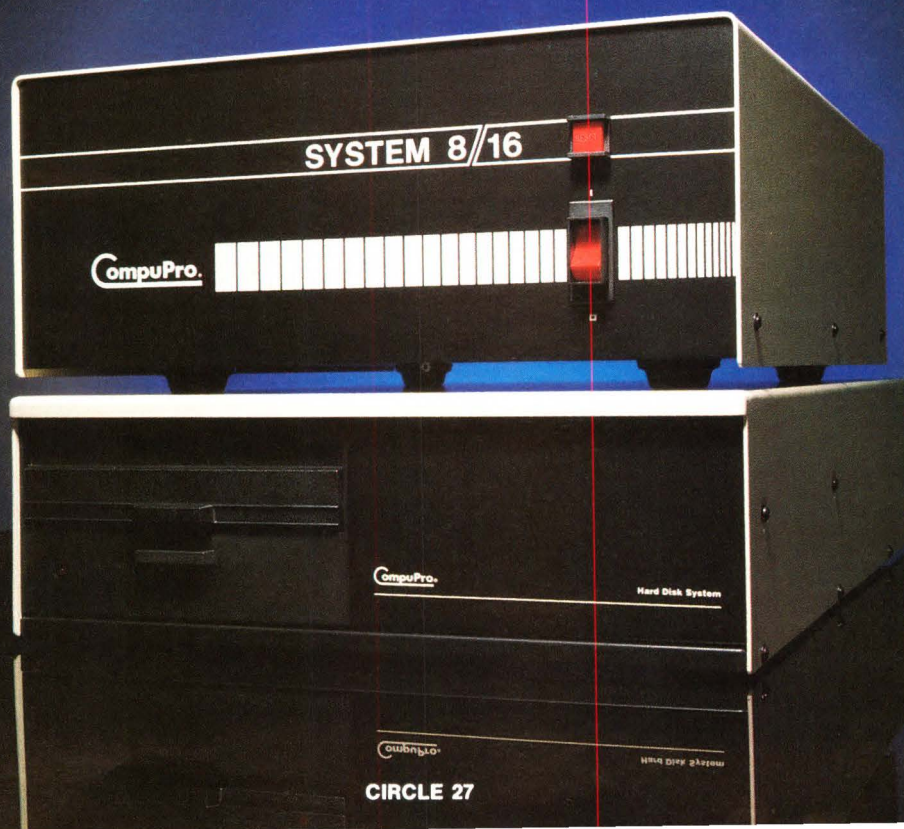
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How integrated software works.

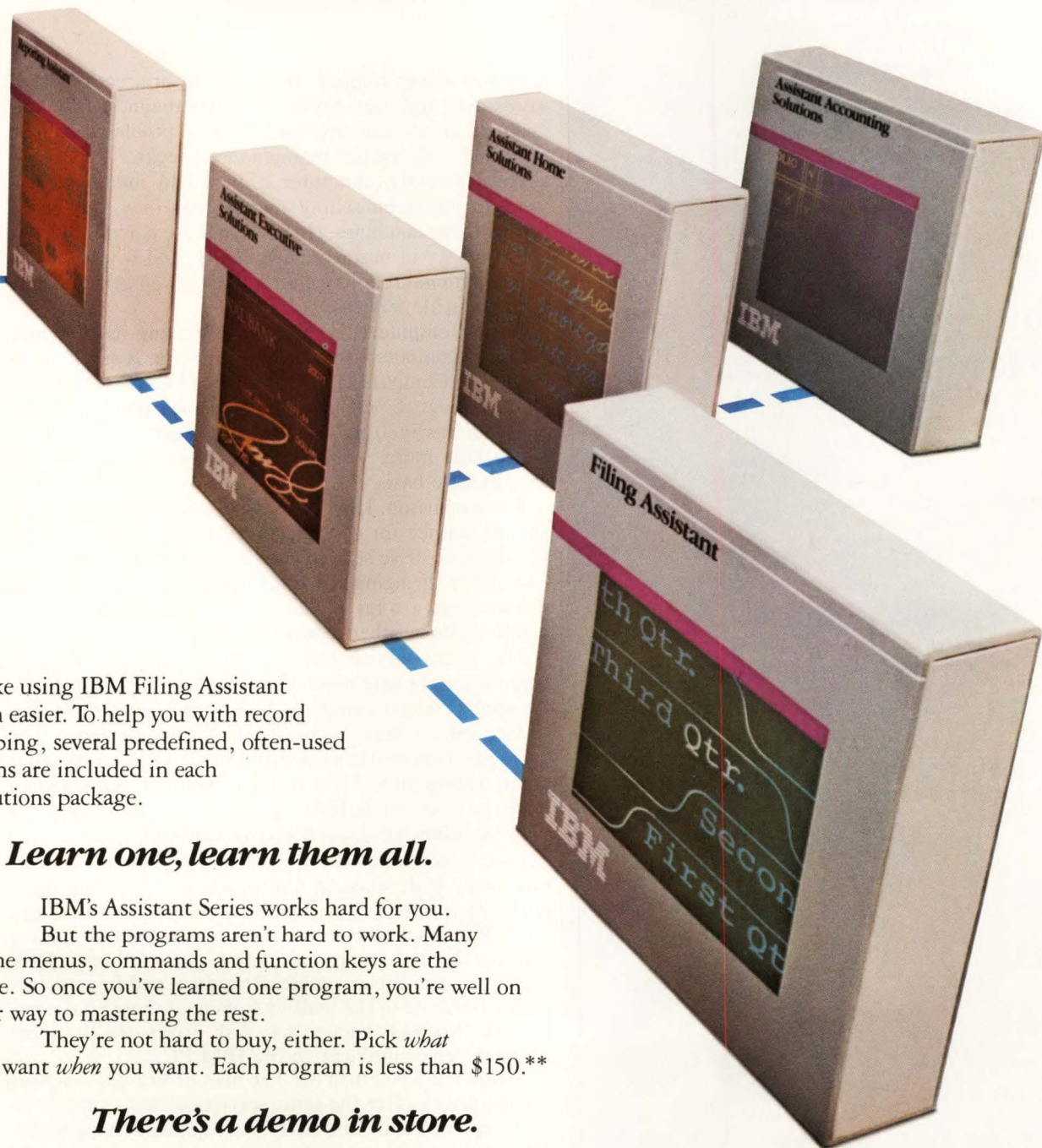
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PERSONAL COMPUTING

(Continued from page 56)

ters, disk drives stopped working, and printers repeated words over and over. Sorbus Systems diagnosed the ailment as stress and overwork. Those problems can be remedied with regular maintenance checks.

Until recently, computer dealers and manufacturers were so intent on selling micros that they overlooked repairing the machines. However, maintenance and repair constitute a big business opportunity, and it wasn't long before national retailing chains like Computerland began to offer repair services.

Some Computerland outlets are making more money repairing computers than selling software. A service contract from Computerland for one IBM PC costs the equivalent of about 10 percent of the machine's purchase price, or as much as \$480 per year. A printer contract costs about \$70 a year more. Volume discounts are arranged on a case-by-case basis.

By comparison, IBM offers two service-contract rates. On-site service for a single machine costs \$165 a year. On-site disk-drive service costs \$83, and monitor service costs \$125, bringing the total to \$373 a year. Carry-in service costs a total of \$240. IBM won't repair add-on boards made by other vendors, however.

The micro-service contract has become a boon for corporations buying slews of personal computers. A heavily used personal computer will need from two to five service calls a year, according to Sorbus Systems. The average service call can cost from \$150 to \$300, with labor alone costing up to \$100 an hour. Xerox charges \$50 an hour for labor, while IBM charges \$96 an hour for products not protected under a service contract.

Exactly how much repair insurance does your organization need? It depends on how much wear and tear users put on their micros. You should also factor in other equipment. Printers need more frequent repairs than computers because there are more mechanical parts to break. Disk drives can also cause trouble. Dirt, dust, and fingerprints each contribute to the malfunctioning of these vital components. It's well known that disk drives are the most common repair problem on the IBM PC.

Who should you turn to? The major third-party service companies all offer the same service options—on-site repair, repair by mail, and repair at a regional service center. Drop-off service, in which the user delivers the disabled machine to a service facility, is the arrangement preferred by many third-party service vendors.

The message for managers is clear: Maintenance and repairs must be figured into your plans to implement personal computing. As personal computers become more common in offices, they're also becoming more indispensable. Swift and careful attention to service will ensure that micros are the productivity-enhancers they're supposed to be. □

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If you need high volume and flexibility, you should know that the Datagraphix 9800 isn't just a 21,000 LPM laser printer. It also accepts the widest variety of paper form sizes of any non-impact printer, with form widths of 6.5" to 16" and a length range of 3.5" to 14". And all 9800 printers feature perf-to-perf printing on paper weights of 16 to 110 pounds, depending on paper type.

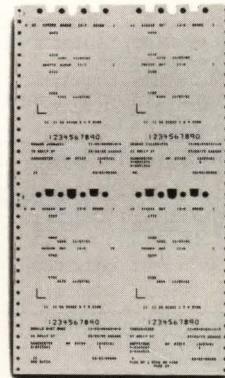
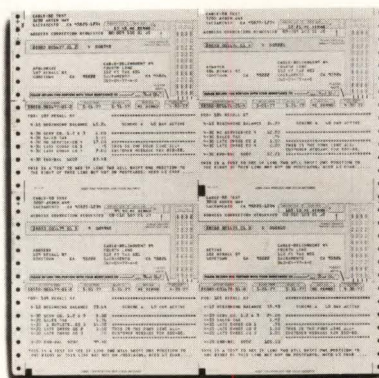
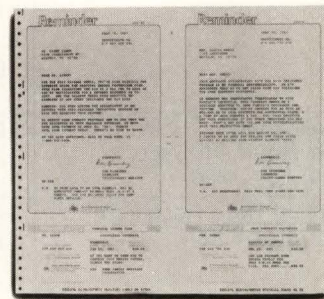
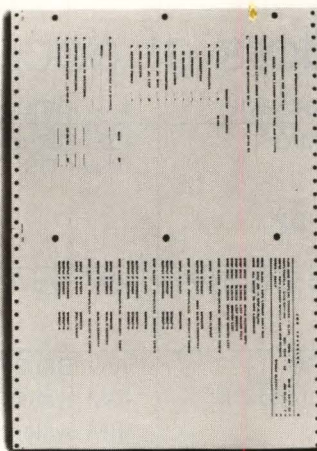
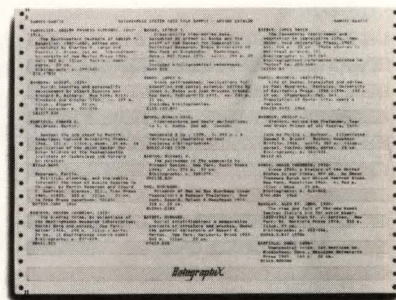
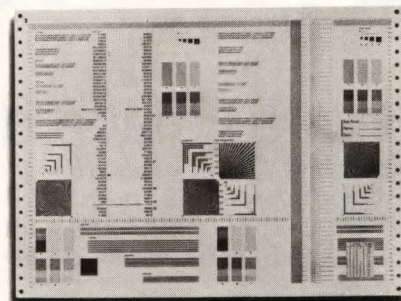
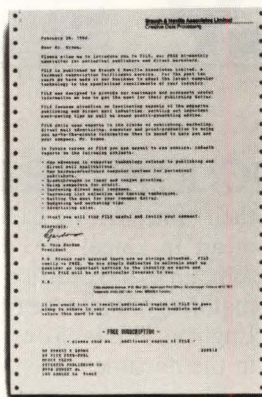
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CIRCLE 30

STRICTLY SOFTWARE

How to make documentation more usable

When I use a word," Humpty Dumpty said, in a rather scornful tone, "it means just what I choose it to mean—neither more nor less."

—Lewis Carroll, *Through the Looking-Glass*.

Most communication takes place somewhere between Humpty Dumpty's linguistic anarchy and the precision of programming languages. Programmers who spend much of

their time writing exactly what they mean in Cobol or Fortran, though, sometimes have difficulty finding that middle ground when they switch to English. This is the essential problem in the documentation of software.

Eliciting documentation—written material that explains a program to those who work with it—from non-writers has never been easy. Nevertheless, it's always been important. Without documentation, the only way

to understand a program is to decipher the original code, a difficult, if not impossible, task. As computing power spreads throughout organizations, the importance of documentation has increased. Those who provide computing tools must explain their work to a wider, less technologically sophisticated audience. Documentation helps these professionals complete their educational mission.

Today, automated documentation

Selected vendors of documentation packages

Vendor	Package	Equipment	Price	Circle
Adpac (415) 981-2710	PM/SS	IBM 360 to 30XX under OS	\$28,500/1st year	560
	DFDP		\$4,000/renewal \$9,500/1st year \$1,000/renewal	
Application Development Svcs. (714) 751-7750	Docu/Manager	IBM System/34	\$1,275	561
Applied Data Research (201) 874-9000	ASC Autoflow II	Any IBM 370/138 and up	\$13,500	562
		IBM systems under OS	\$7,000	
		IBM systems under DOS	\$6,000	
		IBM 4321, 4331, 370/115, /125, /135, and /138	\$4,500	
Business Computer Design (312) 920-0959	Docu-Mint	IBM System/34 and /36	\$850	563
Communication Sciences (612) 332-7559	Explain	IBM PC/XT	\$500	564
Comp Act Data Syst. (213) 992-4361	Facs/OS	Systems under VS1 or MVS	\$4,500	565
Computer Concepts (503) 297-4741	Dossier	IBM 360, 370, 43XX, and PCMs	\$3,650	566
	Dossier- browse	IBM under DOS/VS(E)	\$3,650	
Computer Solutions Mktg. Grp. (303) 377-6428	34/Savior	IBM System/34	\$525	567
Consumer Syst. Svcs. (312) 325-2102	JCLFlow	IBM and PCMs under OS or DOS	\$7,500	568
Diversified Software Syst. (408) 998-0414	DocuText 200	IBM 370 and PCMs	\$7,500 to \$31,500	569
Dybell/Ware & Assoc. (404) 523-4342	Versacomp	IBM mainframes, DEC VAX, and Sperry 9000	\$48,000	570



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But what they don't know is that Mega Group software is dedicated to keeping mainframes alive and well. It's personal software that spreads mainframe power to everybody's individual workstation.

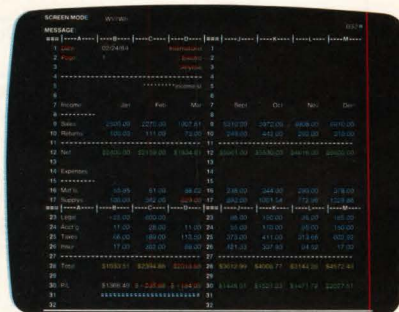
So that now, with any 3270-type terminal, you can do even more than you can do with a micro. Just as easily. Just as fast. And for a whole lot less money.

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A 17" x 23" poster of our endangered species illustration above is yours for the asking. Just write or call to join the cause to Save the Mainframe.

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tools are increasingly taking over the rote and detail work (chart-drawing, cross-referencing, and so on) that most programmers detest and don't do well. These tools generate much of the information that maintenance teams, project implementors, and other technical personnel need to understand a system. They also free programmers and analysts to spend more of their time making documentation both technically complete and comprehensible to nontechnical users. Organizations are also exploring new approaches to creating documentation, particularly materials aimed at end users.

Added advantage

Corporations that have database management systems with integrated data dictionaries have an advantage when compiling documentation. The major database systems come with report-writing programs that gener-

ate flowcharts, cross-references between program modules and programs, and a variety of other reports from information stored in the data dictionary.

Still, the programmer's English plays an important role in the success or failure of documentation. Even

Some organizations bridge the gap between users and system designers with special documentation pros.

with cross-references from a data dictionary, there's no guarantee that field names, for example, will mean anything to anyone. Even if automatically generated documentation carries most of the necessary technical information, the output may be

intelligible only to "techies." Managers must ensure that these reports are pertinent and that end users are provided with additional information, if necessary. This means encouraging programmers and developers to create data descriptions and element names carefully, and assigning a staffer to review them.

Bernard H. Boar, a consultant and author of *Application Prototyping* (John Wiley & Sons, \$30), believes software prototypes should be viewed as "application databases from which complete and accurate documentation can be derived." Documentation generated from an integrated data dictionary will always be more complete, consistent, and accurate than documentation produced manually, he says.

Prototype developers, who emphasize getting systems running quickly, may view documentation for users as

(Continued on page 68)

Selected vendors of documentation packages

Vendor	Package	Equipment	Price	Circle
Executec (214) 239-8080	Promptdoc	Micros under MS-DOS	\$650	571
Goal Syst. Int'l. (614) 888-1775	JCLMan/XP	IBM 370 and up under DOS/VS(E)	\$5,600	572
Group Operations (202) 887-5420	Scan/370	IBM 360, 370, and PCMs	\$23,000	573
Haverly Syst. (201) 627-1424	SGD	IBM 360, 370, 43XX, and 30XX	\$14,500/DOS \$18,500/OS	574
Information Concepts (202) 429-9610	Cobconv	IBM systems running Cobol	\$2,500	575
Ken Orr & Assoc. (913) 273-0653	Structures	IBM 3800, systems under OS or DOS; Sperry; Honeywell; Perkin-Elmer; Wang VS; and Tandem	\$14,000 to \$16,000	576
Rem Assoc. (212) 243-2416	Remdoc Compile/Plus	IBM System/34 and /36 IBM System/34 and /36	\$1,250 \$375	577
Safe Software Syst. (314) 965-3803	JCLSafe	IBM systems under OS, MVS, VS1, or VM	\$14,000	578
Software Consulting Svcs. (215) 861-7920	Doc-F	Systems supporting ANSI Cobol	\$1,000	579
Syncsort (201) 568-9700	Sydoc	IBM mainframes and PCMs under OS/VS, VS1, SVS, or MVS	\$18,750/3-yr. lease	580
Unilogic Ltd. (412) 621-2277	Scribe	IBM 370; DEC System 10, 20, and VAX; Prime; Apollo; and Sun micros	\$3,200 to \$25,000	581

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tions they're working on, rather than the limitations of the language they're working with.

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guage is *non-procedural*. To define a program, you simply "paint" screens and fill in the blanks. Editing and error handling facilities detect input errors — *automatically*.

The net result is not only faster applications development, but applications that are also clearly *better* — easier to work with, easier to maintain. And we know this for a fact:

We used ADS/OnLine to develop our fully integrated line of applications, including our Manufacturing and Financial Systems.

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"I don't even know who makes other modems. As far as we're concerned, there is only one company in the field and that's Hayes."

There are two principal communications verification programs on the market. Most corporate users use Hayes Smartcom II.

Each has its own strengths and weaknesses. Each has its own set of protocols and checks on the user's part.

"Transfers of files and checks on protocols required very little user intervention. Something like this is important to a big corporation."

This means he needs consistent and reliable data to access sources of information to access sources of information.

In a matter of months, the information he seeks is in his hands. "Generally, I can get a user competent with 70 percent of this package in less than an hour."

As a member of the corporate financial staff, he is intimately involved in appropriations, budgeting, product cost analysis, financial accounting procedures.

"I brought a Hayes 1200B into the company. Then I spent at least two weeks trying to find out where it would be incompatible with other microcomputers. The system passed my compatibility test with flying colors."

Then I tried to interrupt its transmissions by using the line which...

"I'd hate to say how many communications packages we looked at until Smartcom II came on the market." In the past, his staff was forced to dig through file cabinets for the information they needed. Now he can get it in a matter of minutes. Did that interrupt the modem? perfect in every respect.

"In my evaluation of the 1200B and Smartcom II, I expressed wonder at why someone would even consider anything else for telecommunications on the IBM PC." Of no less importance is the system's ability to transfer files between two brands of microcomputers running on different operating systems.

Smartmodem 1200B™ and Smartcom II.™

The complete, easy-to-use plug-in telecomputing system solution for the IBM® PC and compatibles.

Hayes, the telecomputing leader, provides the definitive micro to micro link for Corporate America. With our Smartmodem 1200B board modem and Smartcom II communications software, corporate managers are exploring new ways to optimize their communications, while achieving new efficiencies in their day-to-day operations.

Smartmodem 1200B. Sophisticated capabilities. Plug-in convenience.

Our Smartmodem 1200B easily slides into an expansion slot inside the CPU of a PC. So there's no chance of accidental or intentional tampering. And no desk clutter.

For versatility within a corporate setting, our 1200 bps Smartmodem operates at full or half duplex, with rotary dial, Touch-Tone® and key-set systems. A built-in high-speed detector accommodates incoming transmission speeds. And screen displays show current operating status.

Smartmodem 1200B is controllable using any programming language. But none of that is necessary. Your users can get up and running immediately, with no "hand-holding" from you. Thanks to Smartcom II software. Designed by Hayes specifically for Smartmodem and the IBM PC.

Smartcom II. Maximizes Smartmodem. Minimizes user's effort.

Smartcom II's simple menu steps lead users every step of the way in creating, sending and storing files. Plus, an on-line help feature explains prompts, messages and parameters. So you don't have to.

Smartcom II also lets you preprogram macros, and reduces lengthy dial-up and log-on sequences to a single keystroke. It stores communications parameters for 25 remote systems in a directory on Smartcom II. Another Smartcom II directory contains a list of every file stored on a disk. Users can create, display, list, name, re-name or erase any file from the screen.

Compatibility with 9 PC models.

Smartmodem 1200B and Smartcom II are designed for the: IBM PC, PC XT and PC Portable, COMPAQ and COMPAQ Plus, Corona, Televideo Portable, Columbia VIP and Direct IPC 1000*.

Plus free introductory subscriptions. Free access time.

Smartcom II comes with more "built-in" benefits, as well. When you purchase Hayes telecomputing systems for your PC's, your users receive introductory subscriptions and access time to several leading information services. *A value of up to \$200, free!*

Features

Smartmodem 1200B: Direct connect. Auto-answer, dial and disconnect. Touch-Tone and pulse dialing. Full or half duplex. Automatic speed selection. Voice/data communications on same line. Z8† microprocessor with 4K byte control program. Self-test. Two-year limited warranty.

Smartcom II: Prints data while recording on disk. Stores telephone numbers and communication parameters. Defines and stores log-on sequences and 25 remote system commands. Accesses Smartmodem timing parameters, dialing type, etc. requires 96 K memory. Supports serial or parallel printer. On-line help.

Backed by the experience and reputation of the telecomputing leader.

Hayes Smartmodems have helped set industry standards. For unsurpassed reliability and sophisticated capabilities. And Smartcom II further enhances the performance of Smartmodem.

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Quotes reprinted from product review in *LIST: The Business Software Magazine*, June, 1984. Pages 26, 28-29.

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(Continued from page 64)

a burden to be postponed. One or two system designs will be tossed out anyway, they reason. Writing the users' manual *before* designing the system will satisfy the demands of both groups—the prototypers and the users. Frederick Brooks, chairman of the University of North Carolina's computer-sciences department and an early advocate of prototyping, says that writing the users' manual after requirements and specifications have been developed will double-check the system design. The manual should describe a system that fulfills the requirements; the system design should adhere to both the requirements and the manual.

Database independent

Not every organization has a database management system, of course. For those that don't, there is documentation help in database-independent, high-level development systems for mainframes. These in-

clude High Order Software's Use.It, Advanced Technology International's SuperPDL, and ISDOS' PSA-SA. Boeing Computer Services' Argus provides similar capabilities on some micro- and minicomputers running Bell Labs' Unix operating

MSI Insurance takes an unusual approach: It encourages users to write their own documentation.

system. Some microcomputer-based development products, such as Intech's Excelerator package and Nastec's Case 2000 workstation, also have automated-documentation components. Other microcomputer packages, such as Executec's Promptdoc, speed documentation development by providing a format and advice on what

the writer should cover.

There is also automated documentation help for existing programs. MSI Insurance of Arden Hills, MN, for example, runs each program through Consumer Systems' JCLFlow as it moves from testing to production. The package provides flowcharts and a variety of lists and reports on the program's job-control language (JCL). MSI uses Pansophic Systems' Panvalet librarian package in conjunction with JCLFlow to put written comments together with the JCL. According to Gerald Anderson, staff consultant for MSI's information-services department, the resulting reports provide detailed operating instructions, including information about how to run the system, and when and where to send printouts. The approach saves time, Anderson says, and helps ensure that documentation is correct and up-to-date.

MSI, which billed \$180 million in

Design Aids

Vendor	Package	Requirements	Price	Circle
Advanced Tech. Int'l. (212) 869-8686	Super PDL	VAX 11/780	\$15,000	582
Boeing Computer Svcs. (206) 763-5437	Argus	DEC VAX 11/780 /750 /730 Onyx under Unix System III	\$80,000 \$62,500 \$30,000 \$22,500	583
Higher Order Software (617) 661-8900	Use.It	DEC VAX under VMS	\$92,000	584
Intech (617) 491-7380	Excelerator	IBM PC/XT	\$9,500	585
ISDOS (313) 663-6027	PSL/PSA PSA-SA	IBM PC, DEC Rainbow, IBM mainframes under VM/ CMS or MVS/TSO; DEC VAX under VMS	\$45,000 \$3,000	586
Nastec (313) 353-3300	Case 2000 Lifecycle Manager Design Aid	Nastec workstation	\$15,000 \$3,000 \$950	588
Teledyne Brown Engineering (205) 532-1000	Tags	DEC VAX	\$20,000/ database module \$25,000/ diagnostics module	589



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life and casualty premiums last year and has an information-systems staff of 80, is taking an unusual approach to end-user documentation: It encourages users to write their own. End users serve on, and even lead, system-development teams. Typically, the project *manager* for a system is on temporary assignment from the department that will be most affected by it. A project *leader* from information services is responsible for purely technical considerations. The project manager assigns other end users to write the user manuals, and the information-services staff provides technical assistance.

The arrangement has worked well, Anderson says, but has required some adjustments by both users and programmers. The users must assume a new responsibility—and sharpen their own writing skills. The programmers aren't unhappy about giving up a less-than-stimulating part of their jobs, but they're sometimes reluctant to leave the description of their work to others. "A user-written manual will contain just the informa-

tion the user needs," Anderson notes. "Then the programmer reads it and says, 'Yes, but there's so much more to it than that.'"

In many cases, that "something more" is an elegant solution to a technical problem that the user doesn't really care about. A personnel clerk, for example, might want to know how to add a new employee to the payroll and would only be confused by information about file updates and datasets. Sometimes, though, the information a programmer wants to add is essential to the system's operation. Therefore, cooperation between users and programmers in developing documentation is necessary.

A special breed of specialist

Other organizations bridge the gap between user and developer points of view with documentation specialists: employees who, in effect, translate for each group. These specialists must be conversant with the technology, understand user needs, and write clear English. Finding pros with these qualifications is not easy, and fitting

them smoothly into an organization requires careful management.

You'll have to look hard to find a documentation specialist who has been formally educated for the job. Doann Houghton-Alico, president of Technical Information Associates in Denver, teaches a course on user documentation as part of the industrial-communications bachelor of science curriculum at Metropolitan State College, also in Denver. (She believes the course is one of only a few in the country dedicated to the subject.) "It's not just a matter of being able to

As computing power spreads throughout organizations, the importance of documentation increases.

write English," she says. "Documentation specialists must have some technical knowledge; most important, they should be very good at organizing information."

The ability to cope with the organization's politics and a sense of self-worth are also valuable attributes. Few organizations grant documentation specialists the recognition they deserve. Many of these specialists feel like second-class corporate citizens. The fact is, they don't fit naturally into the data-processing world. They don't speak quite the same language as programmers and analysts, yet they are expected to interpret their work. Some companies have found the effort to overcome these obstacles not worth the benefits. "We've never been successful with documentation specialists," says Ray Epich, MIS vice president at Northwest Industries in Chicago. "They always seem to be operating about 90 degrees out of phase with data processing."

Bringing documentation specialists into the mainstream does take considerable effort. According to Houghton-Alico, management must begin by giving the specialist organizational

New language for developers

When molding the first descriptions of an idea into the beginnings of a software system, designers find English too ambiguous to allow rapid agreement on terms. Teledyne Brown Engineering recently announced a new development language composed of mathematical expressions and graphic-engineering symbols it believes provides the precision developers need. Teledyne Brown developed the language, IORL (for Input/Output Requirements Language), for internal use over a period of 11 years. Software engineers can learn IORL in a one-week training course, according to the vendor, and end users can learn enough of the language in about 15 hours of study.

Used with Teledyne Brown's

Tags (Technology for the Automated Generation of Systems) application packages, IORL allows designers to work their ideas out on a minicomputer, test them, and automatically document them. Tags' storage-and-retrieval module acts as an online database for the design, and a diagnostic-analyzer module tests the design's logic. Modules scheduled for later release will automate the tracking of maintenance and modifications and generate system models for simulation testing. Tags and IORL run on Digital Equipment Corp.'s VAX under the VMS operating system with Apollo Computer graphics. The storage-and-retrieval module costs \$20,000; the diagnostics module is \$25,000.



Too many communications systems are forced to take early retirement.

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The NEAX 2400 IMS is the advanced digital core around which you can develop—one simple module at a time—a voice and data system as

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You can start small, with a voice system only, for as few as 184 ports. Then, whenever and wherever your company's growth takes you, you can expand: quickly, easily, and economically. Add ports to more than 20,000. Add the most advanced capabilities, too, including text mail, facsimile, voice messaging, packet switching, local area network, and whatever else the future might bring.

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LINKING COMPUTERS & COMMUNICATIONS

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clout. A high-level manager should introduce the specialist into the organization and make it clear that he or she enjoys management's backing and is entitled to the programmers' cooperation. The specialist should

hang his or her shingle in the data-processing department, not in some out-of-the-way cubbyhole. He or she should be included in staff meetings and planning sessions.

Motivating documentation special-

ists is perhaps the most difficult part of managing them. They do a thankless job, not usually seen as vital to a company's mission. One challenge managers might offer is a review of the organization's documentation policy and standards. Combining documentation-preparation with training responsibilities is another way to enliven the specialist's job. Because the purpose of much documentation is educational, the two go hand in hand.

Online encouragement

The dust on users' manuals in most organizations is a measure of their failure as educational tools. Even the liveliest writing won't guarantee that users will refer to their manuals. Online help is one solution to this problem. A new product, Explain, from Communication Sciences, helps writers create "online manuals" on the IBM Personal Computer XT. The package gives users a "template" and prompts to help them write. The manual works in conjunction with the application it's written for. The user can interrogate the manual in a window while still viewing the active screen that raised the question. According to its vendor, Explain can document microcomputer applications. Versions for minicomputer and mainframe applications are scheduled for release this fall.

Northwest Industries is developing a method to help users learn a new online system without fear of damaging errors. The new system will allow remote offices to send accounting information via personal computers to headquarters for consolidation. According to Ray Epich, the system's developers are creating a practice version of the program that simulates the real thing on a stand-alone personal computer. The practice program will supplement both formal training and written documentation—a new approach to translating between system designers and users. This effort exemplifies the careful attention to the needs of users that helps promote success. □

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CIRCLE 37



by John Seaman, Data Communications Editor

DATA COMMUNICATIONS

Ddp: The competitive edge

How does a giant insurance carrier get the jump on its competitors? For Metropolitan Life Insurance Co. of New York, distributed data processing (ddp) was the answer. By putting computing power in the hands of the end users and offloading host processors with minicomputers, Metropolitan Life has increased its local sales volume by as much as 50 percent. Salespeople can now cover more territory faster.

Metropolitan Life attributes this productivity increase to its new ddp system, Sales Office Network of Intelligent Computers (Sonic), which will be installed in 1,100 sales offices by the end of the year. More than 400 Honeywell DPS6/40 minicomputers are already online in the United States. An additional 150 sales offices in Canada will go online next year.

The Sonic system provides Metropolitan Life with more efficient, cost-effective sales and administrative support. "By decentralizing our computerized sales-support operations, we'll be able to offer quicker, more comprehensive service to our policyholders," explains Richard Anderson, the carrier's assistant vice president for personal-insurance administration.

The Sonic system will give sales representatives, managers, and administrative personnel immediate access to data that formerly were available only by mail from regional or head offices. For example, using only data stored locally, Sonic can project policy values and coverages extended over the life of a policy, compute the face value or premium of a new life or automobile policy, and process other

service transactions.

"Sonic keeps up-to-date policyholder lists and produces sales letters," adds Anderson. "Sonic also lets managers compare sales results with objectives. Moreover, its electronic-mail, word-processing, and filing features considerably reduce paperwork."

These tasks and related transactions are processed at each sales office on a DPS6/40, sharply cutting the cost of communications with Metropolitan's regional computer center in Scranton, PA. "The personal-insurance business is intensely competitive," says Anderson. "We compete with giant carriers such as Prudential and Equitable Life. Before Sonic, we were behind our chief competition in using distributed data processing. Sonic was designed so that we could catch up. Now we can provide top-quality service to all our clients."

Honeywell was chosen as the primary vendor after a one-year pilot program at 20 sales offices in Texas. According to the *Tulsa Business Chronicle*, the other vendors considered were IBM and Texas Instruments. "For our money, the Honeywell equipment offered the best combination of price/performance, local-processing power, and communications capabilities," says Anderson.

The balance of the equipment necessary to implement the Sonic system comprises several IBM 3081 mainframes at the Scranton computing center, accessed through IBM 3725 front-end processors. At the local sales offices, about 3,000 Honeywell VIP-7315 terminals are connected to the DPS6/40 minis. "There are up to

four terminals at each minicomputer sales-office site," says Anderson. Communications are carried via AT&T leased lines transmitting at 9,600 bits per second (bps). "We've had trouble obtaining the leased lines we wanted from AT&T," says Anderson, "but this hasn't delayed us. Soon we'll be using dialup lines as well as the leased lines."

In the past, Honeywell has not been known for the depth of its IBM compatibility. However, notes Bruce Goodman, vice president of personal-insurance systems, Honeywell developed an effective interface to IBM's

The Sonic system will give Metropolitan Life more efficient, cost-effective sales and administrative support.

Systems Network Architecture (SNA). "We had to develop much of the Sonic software ourselves, or at least specify what we wanted and encourage the vendor to supply it," he says. "We're particularly proud of the program-update capability we developed for Sonic." For most applications programs, Metropolitan Life doesn't have to send releases to each sales office and have the software updated locally. Each time the local sales office communicates with the central database, the applications program in use is automatically updated. Operating systems and some local applications software must be updated by distributing new releases.

Implementing Sonic was not easy. Late last year, new sales offices were

(Continued on page 78)

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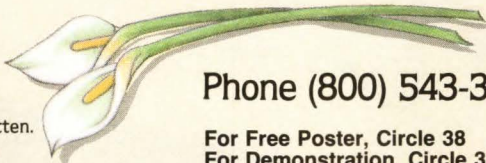
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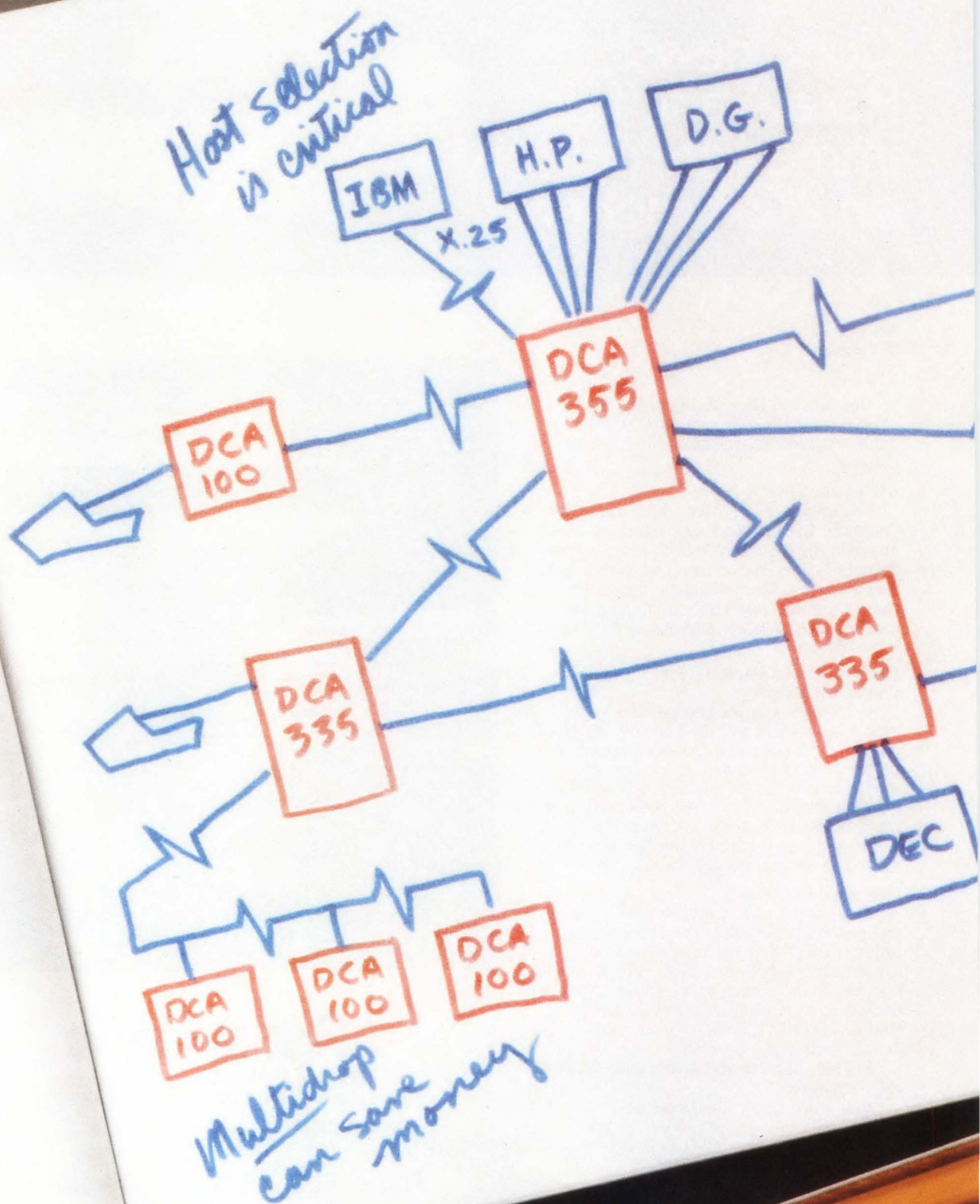
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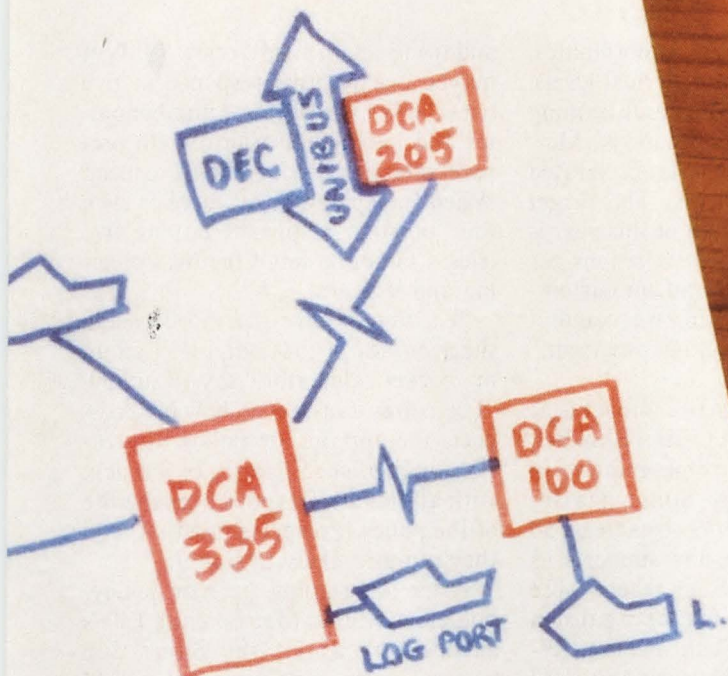
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DATA COMMUNICATIONS

(Continued from page 74)

being equipped with the Honeywell minis at the rate of only three or four a week, "too slow to keep on target," notes Anderson. Also, training the 20,000 or more Metropolitan personnel who would use the system was a big problem.

One answer was a quality-control program called Quality Process Improvement, or QPI, developed by Metropolitan and Honeywell. Before QPI was installed, disputes arose among IBM, AT&T, and Honeywell over whose equipment was at fault when installation bugs occurred. By coordinating parts shipment and testing at a central site, the new program helped eliminate a lot of the finger-pointing.

Another important step was the custom training program developed for Sonic users. Training consultants initiated a top-down approach. The consultants trained top management first, then these executives helped

train their immediate subordinates, and so on down to the clerical levels.

With implementation and training problems firmly under control, Metropolitan and Honeywell accelerated the installation process. The target rate for the second half of this year is 30 to 35 sales-office installations per week. "Without QPI and our customized training program, we couldn't have kept our installations on target," remarks Anderson.

Sonic's most dramatic impact is at the sales-office level. Jim Blimmel, Metropolitan sales representative in Houston, says that Sonic has increased his effectiveness by at least 50 percent. "Our office now supports 15 sales reps. Before Sonic there were only five. I'm not saying the expansion was entirely due to Sonic, but our clerical staff could not have supported all these reps without the ddp system."

Before Sonic, Blimmel's sales approach was to telephone his prospects

and try to set up an interview. "I'd get maybe one positive response in five tries. Now I use the local minicomputer and letter-quality printer to prepare sales letters for each prospect. When I telephone, I get three or even four positive responses out of five tries. I cut out a lot of fruitless phoning and legwork.

"Customers have a lot more trust in the accuracy of the computer than in my pocket calculator," says Blimmel. "I can almost instantly show my prospects the appropriate policy illustration in English, Spanish, or French, with all its ramifications over the life of the policy. Prospects like that, and they're more likely to sign up."

After all, signing up new policyholders is vital to Metropolitan Life's success. "Without the Sonic ddp system," says Anderson, "it would have been much harder for us to stay competitive. It's made all the difference." □



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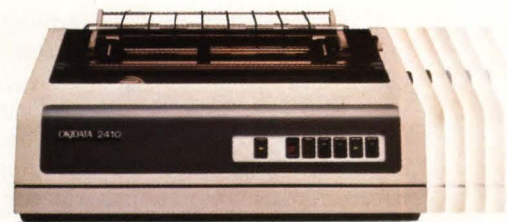
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OFFICE AUTOMATION

OA for small shops

Office automation is not just for large operations. Small businesses all over the country are making good use of available technology to cut costs and improve the functioning of their offices. Small branches and divisions of giant corporations can learn from these progressive small businesses.

Apples are important to 61-year-old Melvin Brown in two ways. First, his business ships 600,000 cases of them a year. Second, he and his employees depend on six Apple II micros to help them keep shipments moving to market.

Brown is president and general manager of Wells & Wade Fruits Co., an apple grower and distributor. Brown and six employees handle all the company's administrative chores. An additional 60 to 70 employees work in packing, and 12 to 50 seasonal workers make up the rest of Wells & Wade's workforce.

"We used to be hard-pressed to handle the workload here without more clerical help," says Brown. All that's changed now. Three years ago, after taking a computer course at a local community college, Brown decided to install a sophisticated Omninet local area network from Corvus Systems Inc., San Jose, CA. Brown is more than satisfied with his move to microcomputers. "Now all our bills go out the same day the order does," he says.

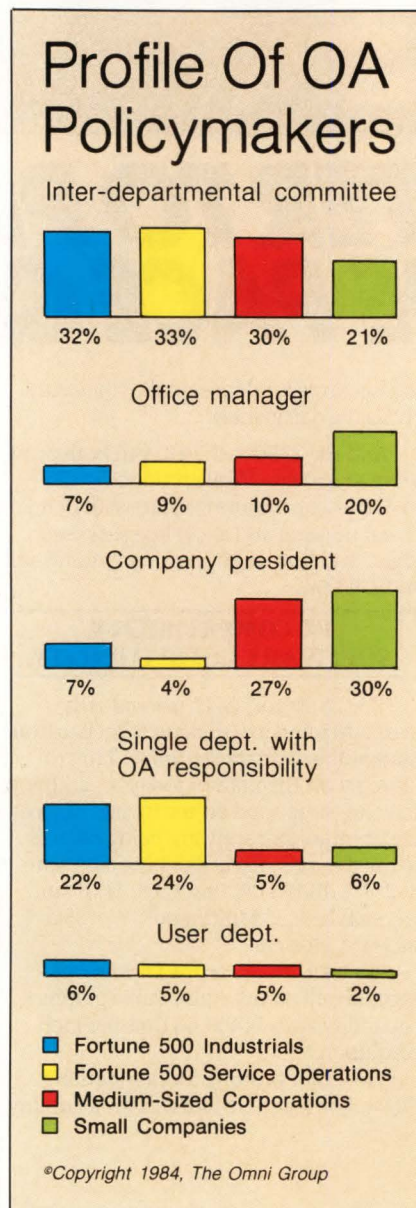
Wells & Wade does its accounting, invoicing, and payroll on the system, which uses a combination of off-the-shelf software and the Versaform forms-generator program. Everyone in the office has a micro, including Brown, and even the auditor who does the books uses the system. "At first I considered microcomputers as a stop-gap solution, just to get us started," Brown says. "Now, with the right soft-

ware and sufficient memory capacity, we're able to do the job."

Richard Sundin, president of Sundin Associates, a six-employee market-research house in Boston, not only introduced the use of microcomputers in his business, but uses one himself.

Today, Sundin Associates uses three Apple IIs and an Apple II Plus. In four years, the company has doubled its business volume, but hasn't had to increase its staff. Sundin has cut the time spent on accounting and tax preparation from up to 30 hours a month to eight hours. At the same time, he has gained greater control over his business. Sundin's success with his microcomputer is partly due to his engineering background. "I had a leg up on this technology, but there is much more help for small-business people now than when I started," he says. Sundin believes that the small-business executive has to come to grips with the technology. "What happens if the person who runs the micro leaves? Then you're stuck," he says. "Like everything else in a small operation, you have to know how to do it yourself."

In Fairfax, VA, Wolpoff & Abramson, a law firm, saves \$7,000 a month in printing costs, thanks to an in-house computerized printing system. Wolpoff & Abramson generates a high volume of documents to support its debt-collection efforts. The pre-printed forms required by law cost the firm \$10,000 a month until it installed a Xerox 5700 printing system a little more than a year ago. Donald Miller, the firm's one-man data-processing department, oversees the system's operation. Today, when a new form must be presented in court, he gets a sample form from the court, goes through a font catalog, and, in a few minutes, designs the new form on the electronic printer. In an average day, he will print out 4,500 sheets on the Xerox 5700, which is linked to the firm's Burroughs mainframe. "Our forms include names and addresses that are automatically pulled from the computer's database. Circuit-court judges will not accept computer print-outs," Miller says. "Before this system was installed, we sometimes had to



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CIRCLE 43

OFFICE AUTOMATION

throw out a year's supply of forms simply because a court decided to change a form without giving us advance notice," he adds.

Miller has programmed the printer to work automatically. Aside from setting up a new form now and then

(the firm uses 65 forms for six court systems), all he has to do is load paper stock and empty the output hopper.

Wolpoff & Abramson also sends out almost 600 computer-generated letters a day, an increase of 50 percent over last year. They are highly legible

and may include signatures and logos from any of the various jurisdictions of district, small claims, and circuit courts the firm serves in Maryland, Virginia, and Washington.

A small revolution

The information revolution has spawned a new group of systems developers: entrepreneurs and small-business owners who, with only an understanding of their business requirements, are successfully establishing OA systems by trial and error. "It wasn't easy getting it right, but we managed to," says Melvin Brown of his experimental approach. "I'm quite proud of learning the hard way and doing so well," says Richard Sundin.

Clearly, small businesses are no longer limiting their OA systems to an electronic typewriter or a dedicated word processor. More frequently, they are taking a high-tech approach to lightening their administrative burdens. And they do it without large, dedicated MIS staffs or costly consultants.

In a recent Omni Group study, small businesses reported that while office automation committees and office managers take part in forming company policy on office automation, most frequently the president is the final decision-maker (30 percent of the time). This is in contrast to the practice in large corporations, where committees set policy approximately 32 percent of the time, and a single department (usually MIS) is responsible about 22 percent of the time (see chart).

Despite their inexperience, these small businesses make installing OA look easy. Perhaps this is due to their willingness to experiment and make firm decisions. Managers of smaller divisions of large corporations can learn from their experience. □

Randy J. Goldfield, founder and president of the Omni Group, an OA consultancy based in New York, is a frequent contributor to this column. Her co-author, David Culver, is a senior consultant with the firm.



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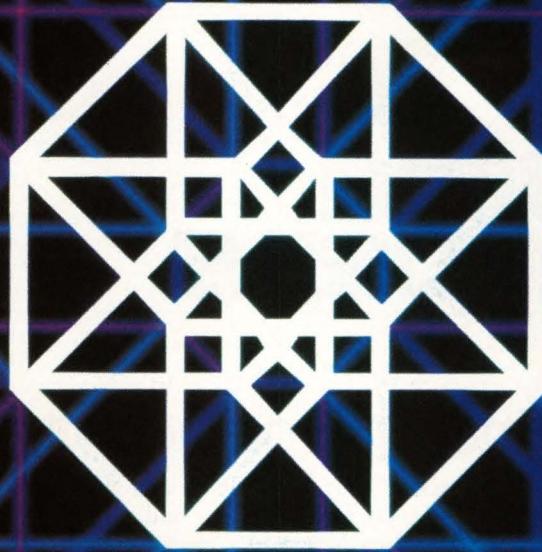
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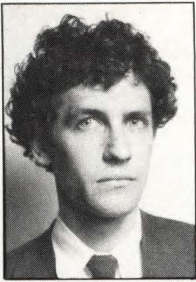
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by Lawrence M. Honig

FOLLOWING THE LEADERS

AT&T's Unix: The only game in town?

For applications development, conventional wisdom holds that the future is Unix. But while pundits debate the significance of IBM's PC-IX entry and AT&T's ability to establish its Unix System V as the standard, a quiet phenomenon outside dp departments may change the ground rules for applications development.

Data-processing shops, seeking to maximize application-software portability and minimize development time, will naturally make Unix their standard operating system. However, this line of reasoning overestimates the importance of Unix (and the relevance of who will dominate the Unix-support business) while underestimating the importance of outside vendors (like Lotus Development Corp.) that supply workstation users with the software to solve many of their application problems.

Once users pass from computer naivete to reasonable competence, they are more capable and creative with their machines than managers care to admit. The current generation of workstation software (beginning with the release of Lotus 1-2-3) encourages creativity.

The features that make Symphony, Lotus' successor to 1-2-3, as easy to use as a word processor or as a spreadsheet (immediate visual feedback, interpretive rather than compiled structure) make it a popular applications-development program as well. It contains a wealth of powerful features that provide the end user with a state-of-the-art programmer's

"toolkit." Any Symphony user with some application expertise and a little exploratory verve can easily create powerful custom software by writing macros in Symphony command language.

Although most MIS/dp managers won't admit it, they really don't know as much about the application problems the end user encounters as the user does. Most MIS/dp managers are generalists who don't have time to learn enough about each application to rival the user's knowledge. However, once trained to use the proper tools, the end users can often learn to specify and solve their own problems without getting into data processing's development cycle. It doesn't matter that these ad hoc solutions may be amateurish or imperfect. The major cause of user dissatisfaction with traditional, centralized dp is the ratio between time in development and time in use.

If you are an MIS/dp manager, spend time reviewing some of these ad hoc applications. Make a list of the "spontaneous experts" who have put together operational systems in Lotus 1-2-3 or dBase II. You will probably be amazed at how powerful these inexpensive programs can be—and how many competent developers there already are in your organization.

The biggest disadvantage of writing high-level applications in Symphony or Lotus 1-2-3 is a slower production rate. Because these programs are designed to be many things to many users, they may sacrifice maximum efficiency for ease of use. How-

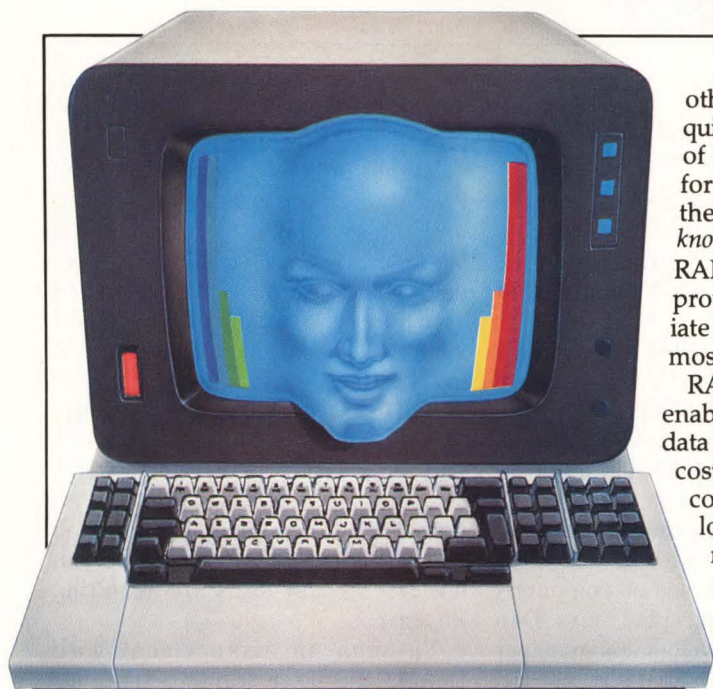
ever, when a Symphony application reaches its limits and the user turns to the dp staff for help, a detailed prototype will exist.

The aggregate sales rate of the leading independent micro-software houses (Ashton-Tate, Lotus, Microsoft, etc.) means that by year-end more than 1 million users will have purchased copies of a high-level applications-development toolkit. Application portability will flourish because these vendors have a large stake in supporting as many of the popular workstations as possible without rewriting their documentation or training special support staff.

Although Unix and C language will be important during the next decade, most users—and even developers—of end-user application software won't understand their inner workings. Whenever throughput is critical, volume or speed requirements justify custom code, or absolute reliability is key, users will continue to look to the data-processing department for answers. When users decide to turn to the pros, they may have a working prototype written in Lotus 1-2-3 or Symphony command language to serve as a blueprint for their finished products. Dp managers be warned: Keep your eyes on "consumer-oriented" packages. They can do a lot more than spreadsheets! □

Lawrence M. Honig has been a frequent contributor to this column, first with the Gartner Group and now as president of Thought Products Corp., Newton, MA.

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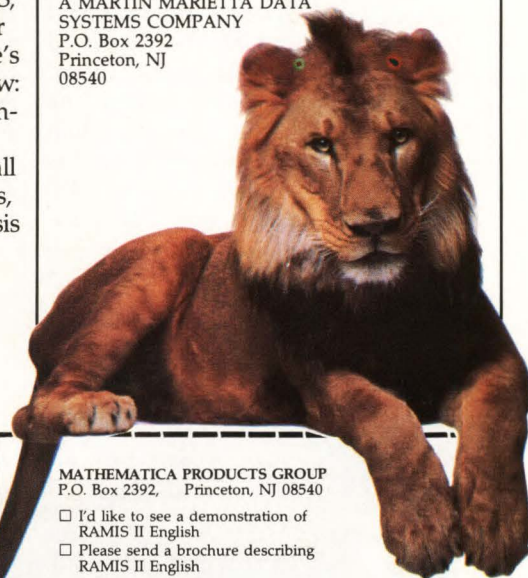
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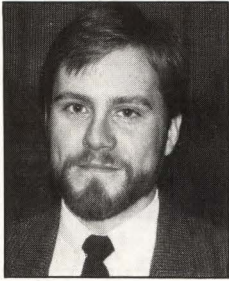
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by David Roman, Staff Writer

TRAINING

The state of IBM's IIS

Big Blue's Interactive Instructional System (IIS) is under fire. Critics of the widely used mainframe computer-based training (CBT) system say it's difficult to use, out-of-date, and can't support graphics. New microcomputer-based CBT systems are adding their own competitive heat. IIS has its defenders as well, but as more organizations turn to CBT to satisfy their training needs, trainers and managers wonder how IBM's product, once the leading CBT system, holds up against competition from newer training products.

Not very well, by James Rutherford's estimate. Rutherford is president of Goal Systems International Inc., Columbus, OH, the maker of Phoenix, IIS' stiffest competition. "IIS is an extremely old system," he says, "and it hasn't changed much over the years." Rutherford asserts that corporations are aware of IIS' limitations and that new CBT cus-

tomers are staying away from the product. "IIS' customer base is static," he says, "at a time when the market is growing by leaps and bounds."

It's difficult to tell if Rutherford's assumptions about IIS' lethargy are correct because IBM doesn't release any of its sales figures. However, his assertion that the CBT market is expanding can be checked with some certainty. "There's been a dramatic increase in the number of end users that have to be trained on computers and computer concepts," says Dan Clinton, IBM's development manager for IIAS/PS. (In 1980, IBM split IIS into two components, the Interactive Instructional Authoring System—IIAS—and the Interactive Instructional Presentation System—IIPS. Nevertheless, most users refer to the product as IIS.) As end-user computing becomes more widespread, so does the demand for training. CBT has become the preferred method for

providing this training.

Rutherford believes Goal Systems' Phoenix system is experiencing an upswing in popularity as favor with IIS fades. He cites the 800 or so Phoenix systems installed since early 1983 as evidence. In comparison, about 2,000 IIS systems have been installed in North America, according to Crwth Computer Coursewares, Santa Monica, CA, a vendor that develops and sells IIS courses. If Crwth's estimates are correct, Goal Systems is making significant gains on IBM. What the figures don't reveal, however, is how users are acquiring Phoenix.

Through an arrangement with Deltak, the large training-materials vendor based in Naperville, IL, the Phoenix presentation system is given to corporations that buy one of Deltak's Phoenix courses. In this light, the pace of the Phoenix placements is less startling. And while a comparison of the two products' actual sales may be difficult to compile, Rutherford readily concedes that IBM has the upper hand in existing installations. Even from its earliest days, Phoenix bowed to IBM's dominance. Goal Systems followed Big Blue's lead when it developed its own system, and made Phoenix IIS-compatible. With minor adjustments, Phoenix will run courses written for IIS.

Head to head, how do IIS and Phoenix compare? Price-wise, Phoenix is about three times as expensive as IIS. Rutherford says customers select Phoenix over IIS in spite of its price "for the same reason someone buys a Cadillac instead of a Ford." Rutherford says Phoenix offers three advantages over IIS. First, it uses mainframe resources more efficiently. Also, "it's very easy to install and very easy to use." It seems that IBM does assume IIS users have a certain level



Lud Pietz, the manager of education and instructional systems for IBM, examines IIAS/PS course materials as Dan Clinton, the development manager for IIAS/PS, looks on.

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TRAINING

them the responsibility of installing the system. But Phoenix' other advantages are challenged by Phoenix and IIS watchers.

"Goal Systems says Phoenix is more efficient than IIS in its use of mainframe resources, and it is," says Marsha Seidman, president of Crwth Computer Coursewares. When IIS courses are written online, connect time can be lengthy and expensive. Phoenix courses are also written online, but the system doesn't burden the mainframe or push up development costs. Goal Systems hasn't considered developing an alternative to online authoring, according to one Goal Systems employee.

With IIS, however, there is an alternative to online authoring: writing courses offline and uploading them to the mainframe in final form. This is the method used at Arco Oil & Gas Co., Dallas, a division of Los Angeles-based Atlantic Richfield Corp. One of the advantages of this approach, besides the fact that there's no connect time while the course is being written, is the ability to use any available software program to develop the course.

Mainframe CBT is really education for the masses. Micro CBT is for small groups or individuals.

Jeannie Darnell, the computer-based-training administrator at Arco, says the word-processing packages, spelling checkers, and productivity tools used by course writers provide much more flexibility and versatility than a standard authoring language. "You can use whatever software you want to get the courses exactly the way you want them," she says. "Then you use the batch processor to bring them up under IIS. There's no batch option on Phoenix, and that's a problem."

IIS courses can also be written with the IBM Personal Computer Instructional System (PCIS) on the PC and



"IBM's biggest strength is the upward and downward compatibility between its mainframe and micro CBT systems."

Seidman, Crwth

uploaded to the mainframe. This method also sidesteps online authoring and permits the use of PC software.

Ease of use

IIS is offered with three authoring languages, but Rutherford believes that even the simplest of these, the Course Structuring Facility (CSF), is "like a programming language." Dan Clinton of IBM disputes Rutherford's contention. "We offer a range of authoring languages that few competitors can match," he says. "They run from a technical language that simulates data-processing applications to the high-level CSF language, which is intended for a nonprogramming audience. Any subject-matter expert can write courses with our languages."

However, even trainers who speak favorably of IIS, such as Jeannie Darnell, say Phoenix is simpler to use. Phoenix does include an "IIS-like authoring language," according to Rutherford, "but virtually all course authoring is done with Ease." Ease is Phoenix' languageless course-writing facility. It is completely menu-driven, prompting an author step by step through the course-writing process.

"The prompting menus are very useful to the first-time CBT user," says Darnell.

This strength turns into a weakness once the user gains a little experience, Darnell says. "Let the new users work with the menus to write one course, and they'll love them," she says. "Make them write two or three courses, and they'll hate them." If users tire of Phoenix' menus, they have the option of using the IIS-like authoring language, which dissolves the original ease-of-use advantage of Phoenix. But that original advantage is strong enough, Darnell says, to put Phoenix in serious competition with IIS. "Goal Systems is making points with start-up CBT operations at companies that never had CBT before," she says. "Phoenix has nothing over IIS. It's winning out where IBM is fumbling—in marketing strategies."

There are other problems IIS is said to have: that it is old and has inferior graphics. IBM first developed and sold IIS under a different name in the 1960s. Since then, IBM has added new authoring languages, the compatible PCIS, and has regularly is-

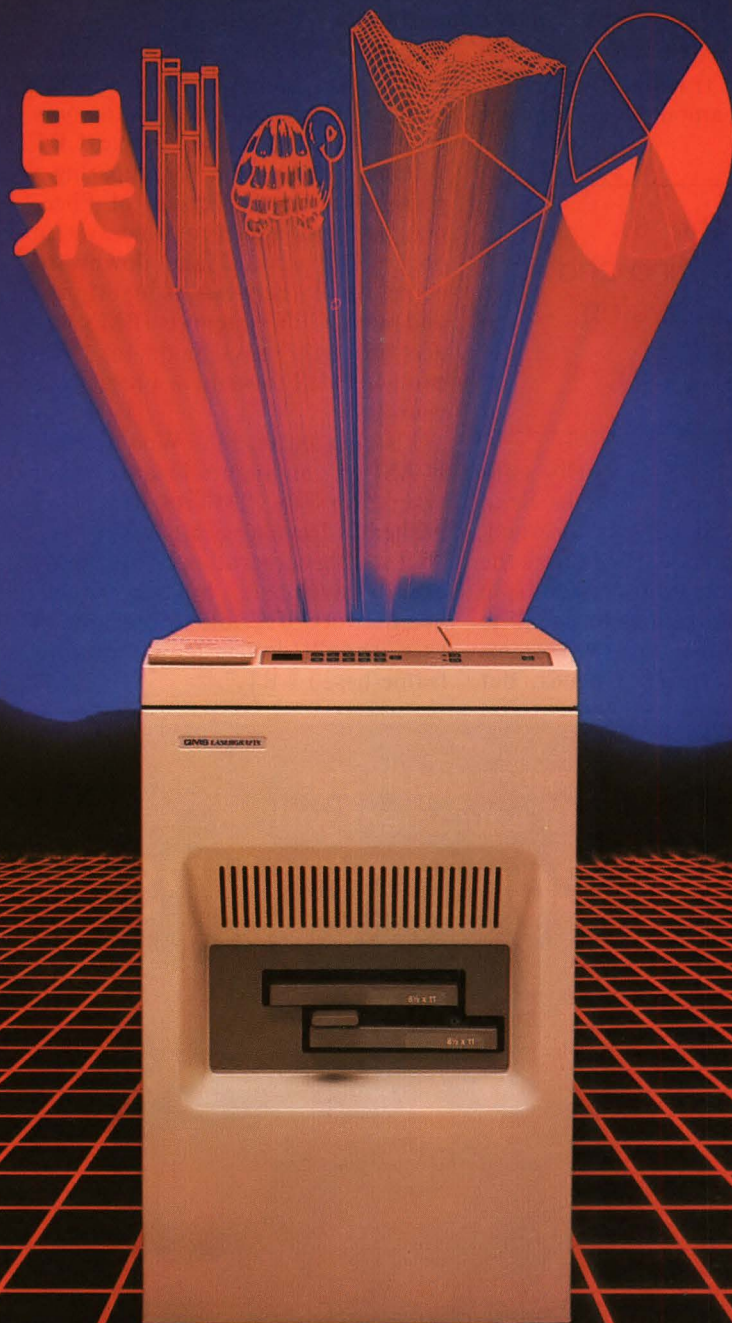
"Phoenix has nothing over IIS. It's winning out where IBM is fumbling—in marketing strategies." *Darnell, Arco*

sued new releases, or upgrades, of the product. The latest release of IIS/PS, the third since 1980, appeared last March. Darnell credits IBM with "making necessary changes in IIS in response to customer demands."

Complaints about inferior graphics have only surfaced since personal-computer CBT has become popular. Those CBT courses frequently use color graphics, and this has "spoiled" some users, according to John Woolsoncroft, the executive assistant to the president for Advanced Systems Inc. ASI, Arlington Heights, IL, sells

(Continued on page 90)

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TRAINING

courses for both the IBM PC and IIS. "You can really exercise the graphics capabilities of the PC if you know you're writing a course for just one user," Woolsoncroft says. IIS courses on a mainframe are offered over connected terminals, which are unlikely to have graphics capabilities. Still, IBM has linked the latest release of IAS/PS with its own GDDM software, which is described by Dan Clinton as "IBM's primary graphics product." Graphics terminals are needed to take advantage of this enhancement.

Although graphics is one feature that might recommend microcomputer CBT over mainframe CBT, the size of a company and its training needs are more likely to be the deciding factors. Hammermill Paper Co., Erie, PA, was one of the companies that received a free Phoenix system from Deltak. Phil Iobst, training and planning coordinator, says the system

has hardly been used. "It takes a big development effort to create a good course," Iobst says, "and we don't have enough people who need the same kind of training to justify spending that amount of time and expense."

IBM offers the PCIS authorizing and presentation system for smaller organizations.

Mainframe CBT is really education for the masses, Marsha Seidman says. Micro CBT is for small groups or individuals. IBM offers the PCIS authoring and presentation system for organizations too small to put IIS to good use. The two systems meet different training needs, but

IBM has made them compatible to give organizations "greater freedom to develop instructional strategies," according to Lud Pietz, IBM's manager of educational and instructional systems. It also makes IBM the only vendor that offers compatible CBT systems. Goal Systems is preparing a personal-computer version of Phoenix, but it is a presentation system only. "The upward and downward compatibility between its mainframe and micro CBT systems is IBM's biggest strength," says Seidman. "You can use PCIS to write or present IIS courses."

Looking ahead, John Woolsoncroft of ASI sees an unquestionably bright future for IIS. "Micros are being pushed as learning centers," he says, "but the big corporations that already use IIS have made a huge investment in a network of terminals. Because of this, they'll continue with mainframe-based CBT." □

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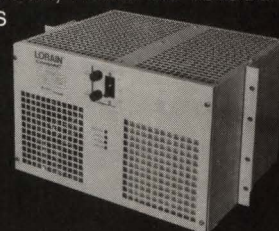
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Outstanding Data Center



In 1982, BICS moved its headquarters to the Life Investors Building in Cedar Rapids (above). BICS now occupies 30,000 square feet of office space, 65 percent more than before. In addition, it has branch sites in downtown Cedar Rapids, Des Moines, Waterloo, and Sioux City.

Banks of Iowa Computer Services (BICS), which serves 93 banks in the midwest, designed its own data center in Cedar Rapids. "We knew our unique requirements," explains Dave Adelsperger, vice president of operations. "By overseeing the project ourselves, we were assured of getting the new center we envisioned."

Two years ago, BICS was faced with a problem familiar to rapidly growing companies. "We were running out of space," says Adelsperger. "We occupied four different floors in two different buildings in downtown Cedar Rapids. We had no meeting rooms and our programmers were working on top of one another."

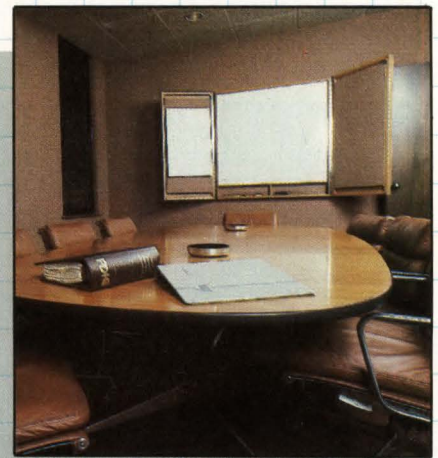
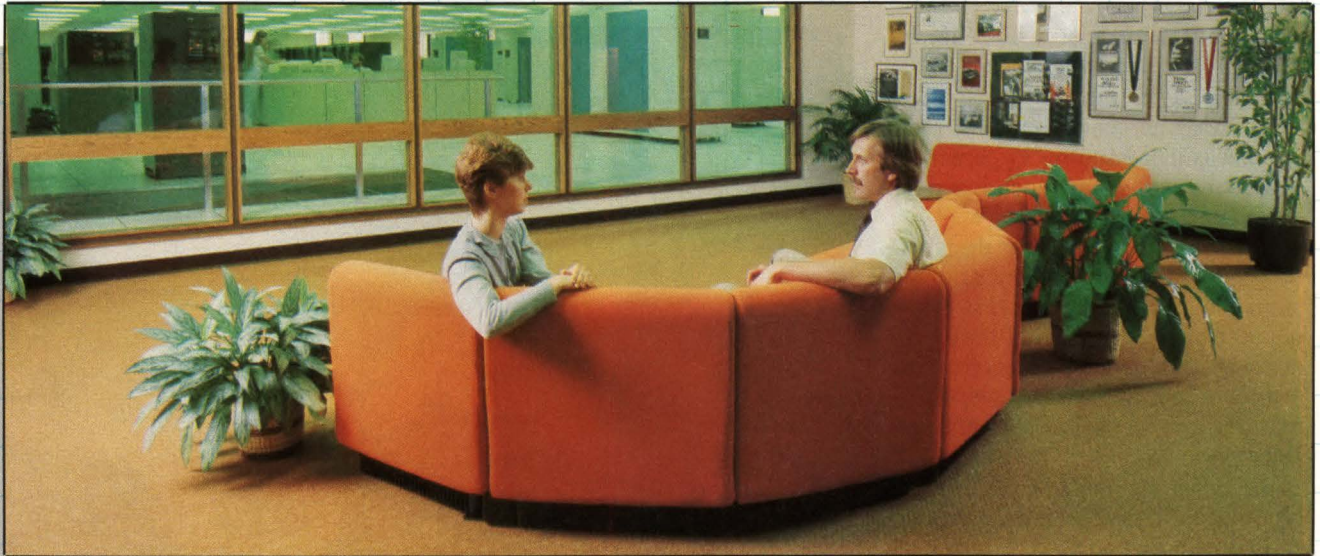
The solution was to renovate the



Brian Scott, president of BICS and head of MIS/dp, confers with Dave Adelsperger, vice president of operations (right). Office furniture was supplied by Lehigh Leopold.

by Theresa Conlon, Staff Writer

Photos by George Ceolla



The main computer room's (top) glass enclosure keeps visitors out and noise in. One side of the room houses 82 spindles of IBM 3350 disk storage, and two IBM 3380 controllers. The room houses an IBM 3081 mainframe and a Tandem Non-Stop II. The teleprocessing-support room (left) has 450 terminals (the data center houses 100). BICS' soundproof conference room (above right) features low lights and muted colors.

Outstanding Data Center

third and fourth floor of the Life Investor's Building in northeast Cedar Rapids. BICS increased its office space by 65 percent. Computer-room space was increased by 37 percent to 30,000 square feet, and meeting-room space more than doubled.

The new data center was designed, reconstructed, furnished and occupied within three months. BICS management began by outlining the organization's needs, determining available space, analyzing work-flow patterns to create a floor plan, and projecting growth.

BICS houses an IBM 3081 and a Non-Stop II from Tandem Computer. One hundred IBM 3178 terminals in the center are connected to the IBM mainframe. The Tandem supports the BICS electronic-funds-transfer network. (Continued on page 96)



The systems division (above) is responsible for the development, implementation, and maintenance of the operating systems. Because systems programming involves sensitive information, the office is located in a secure area. BICS' fully secured documentation library (left) has IBM 3178 terminals for access to the mainframe. The Mac 530 (above right), logs each entry.



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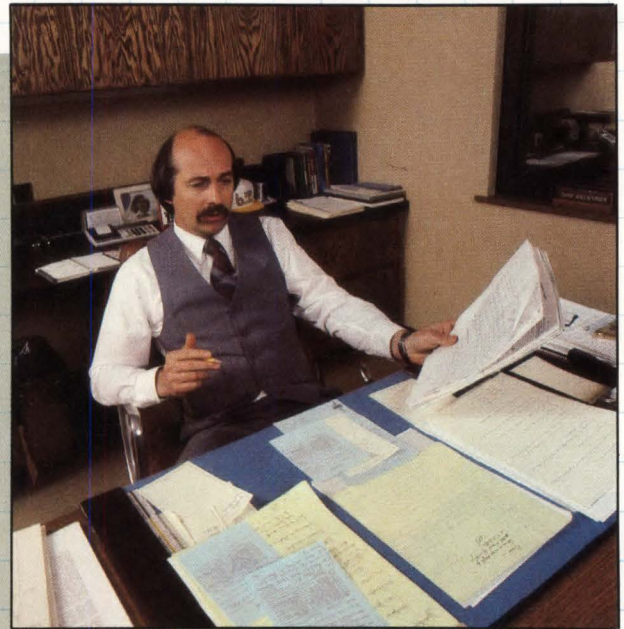
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David Adelsperger (above), vice president of operations and the man responsible for BICS' big move, has settled into his new office in Cedar Rapids. Schlage provides the main security system for the entire building (left). A multipurpose room (above right), provides a meeting place for the company. Here, classes are offered to customers on the use of each of BICS' systems. BICS also offers internal training.



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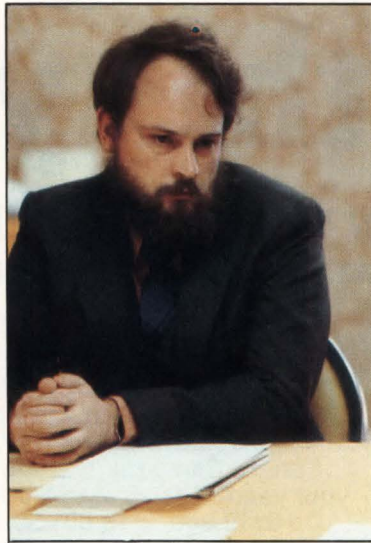
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ARTIFICIAL INTELLIGENCE:

Roundtable participants included (left to right): Mache Creeger, Richard Brown, Fred Luconi, Howard Shrobe, Gene Kromer.



Within the last 18 months, a new kind of automated tool has become available to help executives manage complicated operations—artificial intelligence. Reaching out of the realm of research and academic study, AI is beginning to offer corporations powerful ways to raise productivity. "Some observers have said that a person can be 10 times more productive using AI," says Gene Kromer, vice president of Intelligenetics, a Menlo Park, CA, consultancy.

At the vanguard of this technology are corporations deploying expert systems. Schlumberger Ltd., the French conglomerate with U.S. headquarters in New York, is using an expert system to save millions of

dollars a year on oil-drilling projects. The automated system advises engineers on prospective wells, determining, for example, when it is no longer cost-effective to continue drilling at an exploratory site. (Schlumberger provides the test instrumentation and subsequent data analysis for a number of major oil companies.)

Schlumberger's expert system analyzes geological and other test data to arrive at its conclusions. It uses a set of rules and queries, just as a human expert would, to reach conclusions. Schlumberger got into the AI business by buying several Lisp machines (up to \$100,000 each) and hiring experts. The cost of this effort, though sizable, is small in comparison to the outlays necessary to start and support an exploratory-drilling program. Schlumberger has no plans

to sell or license its expert system to other energy-producing companies—it is too busy using the system to get a jump on the competition.

A Lisp (short for list-processing) machine is a special computer running an interpretive language that processes lists of symbols. Lisp machines help develop the high-level languages needed to sift through mountains of data to reach conclusions.

For many corporations, AI means much less arcane applications. For example, at its Stapleton Airport hub in Denver, United Airlines deploys voice-recognition equipment to speed up baggage handling. Handlers input characteristics and destinations of the baggage by speaking into microphone headsets, instead of writing down the necessary data. A computer

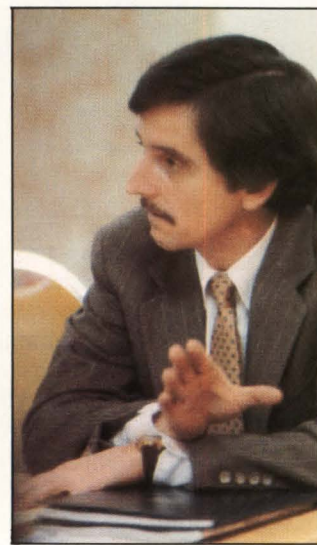
OUT OF THE LAB, INTO THE WORKPLACE

Once a curiosity confined to laboratories and the speculations of high-tech prophets, AI is becoming a valuable management tool.

by John Seaman, Data Communications Editor

Larry Harris, and Joe O'Donnell.

Photos by Ivan Massar



operating according to AI principles analyzes the data and speeds up the handling process by as much as 100 percent. Many work hours are saved and customer satisfaction is greatly enhanced.

Recently, Computer Decisions convened a roundtable of AI experts to discuss how corporations can best take advantage of the commercial and practical applications of AI. The participants hail from user corporations, like E.I. du Pont de Nemours & Co. Inc. and Digital Equipment Corp.; consultancies, like Arthur D. Little; and a variety of AI vendors. The experts began by defining AI, a definition that was shaped by some of the applications that have grown out of this new methodology. Among the applications discussed were natural-language database-query software,

expert systems, robotics, automatic programming, and voice and vision recognition. Of these technologies, only voice and vision recognition are still in the research stage of development, the rest are commercially available.

Charles Rich: AI is such a young field that it really defies precise definition. But Patrick Winston, head of the AI Laboratory at Massachusetts Institute of Technology [Cambridge], has offered a "diplomatic" definition. Winston says AI is the discipline that concerns itself with making computers function like intelligent human beings. That definition steers around most of the controversial philosophical problems.

William Taylor: We have a kind of working definition at Gould. AI is a programming style, in which pro-

grams embody data, rules, and explicit goals for solving problems. But there is another of Pat Winston's definitions that I also like very much: He says AI is an effort to make computers more useful.

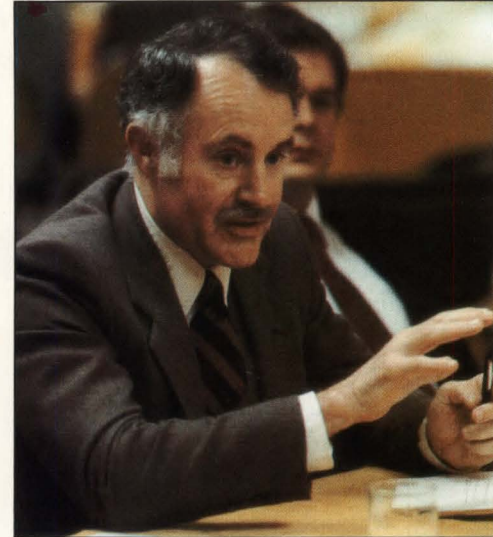
Mache Creeger: When defining AI, it's important to keep in mind that the way an AI program solves a particular problem may be drastically different from the way a person might do it. The results of human thought and "machine thought" may be similar, but the strategy employed by the AI machine may be quite different, more tailored to what the computer system does best.

Gene Kromer: As a consultant, I have had to answer such questions from management as, "What is AI going to do for us?," "How is it different from what we do now?," or "Why can't I

Artificial Intelligence

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Ed Payne, Arnold Kraft, Eamon Barrett, Qunio Takashima, William Taylor, and Charles Rich (left to right) discuss how corporations



create an AI program on my conventional processor?" I reply that AI brings to corporations a set of tools and a programming method that is different from past norms. AI is rapid prototyping, and you get results very quickly. AI programs are particularly handy when they run on a Lisp machine with a very rich user interface. However, AI programs [Lisp programs] will also run on conventional processors, even if that's not the most productive way to use AI.

Richard Brown: If you ask a conventional system or program how it arrived at a particular solution, the system will not be able to tell you. But if you ask an AI system the same question, it will carry on a dialogue and print out the explicit rules it used to arrive at the solution. With a conventional computer, the rules are buried inside the code; you can't find them, even with the aid of functional and design specifications. Having the rules out front, an AI system lets you achieve your long-range goals more quickly and lets you debug and maintain systems more easily. This might not be a definition or a fundamental characteristic of AI—it might only be considered an advantage or a matter of style.

The experts next discussed the movement of expert systems into corporations. Expert systems offer many advantages over conventional application programs, they noted. However, some were worried about the commercialization of AI.

Arnold Kraft: The expert systems we're familiar with can be considered apprentices. These systems capture the rules used to arrive at a decision very well. They bring to the surface the underlying rules in a way that has not been done very clearly in the past. By capturing the rules and arranging them in a smart apprentice system, expert systems can give a lot of assistance to someone engaged in a complex task. Expert systems used in this way can be very productive. In some cases, expert systems are better than human experts because they can examine more rules simultaneously than a human being and they never forget.

Fred Luconi: We should keep in mind that the forces driving traditional AI research and those driving the commercial exploitation of AI are quite different. The goal of researchers has been almost philosophical, while the goal in business is quite different.

Taylor: I am very worried about this point and how it will affect the future

development of AI. All the researchers are going off and starting new entrepreneurial AI-supply companies, and as a result, there isn't going to be any research to harvest five years from now. We are eating the seed corn and we don't know what to do about it. My company is going to the universities and getting experts to consult for us on today's problems, as opposed to next year's. All the mountain climbers are becoming bulldozer drivers, because it pays better. Nobody is climbing further up the mountain.

However, talking about the goals of AI doesn't do anything for the people who sign my paychecks. Talking about a set of tools that can write software more quickly and get a faster payback turns them on. Pure AI and its goals have no box-office appeal at budget time.

Expert systems may be difficult to sell to the brass, but they aren't the only applications of AI, the participants noted.

Larry Harris: When you look at the marketplace and the general need for AI techniques, you will be hard pressed to find an application that has broader appeal than data retrieval and analysis. Every executive has to

should implement AI projects.



get information out of a computer at one time or another.

Natural-language software like my company's Intellect lets the computer understand the languages of humans, such as English, French, or Japanese, rather than Cobol, Fortran, or Focus. The user is free to express a request in any reasonable way in English. The burden is on Intellect to understand a particular English phrase and translate it into whatever instructions the computer needs to retrieve and analyze the particular information required.

Joe O'Donnell: A fifth-generation database-query language such as Intellect lets many users get involved with the computer quickly and easily with minimal training. At Du Pont, we use Intellect in our Polymer Products Department. We have two large financial applications, one containing 40 million pieces of information. Intellect is being used by clerical employees and middle managers to retrieve the financial information and display it in graphic form. Training to use Intellect is a key factor. When users begin to see quick results, productivity rises.

Eamon Barrett: Another practical application of AI is defense and counter-

intelligence analysis. The government is being inundated with information, and within the next few years the amount of data—images, text, and

signals of all kinds—will probably increase tenfold, while the number of people that will be provided to analyze this information will only increase by

Roundtable participants

Moderator: John Seaman, data communications editor, *Computer Decisions*.

Eamon Barrett, president, Smart Systems Technology Inc., McLean, VA.

Richard Brown, AI research group leader, Mitre Corp., Bedford, MA.

Mache Creeger, product marketing manager, Lisp Machine Inc. (LMI), Los Angeles.

Simon Curry, senior systems designer, Silicart Inc., Montreal, Canada.

Larry Harris, president, Artificial Intelligence Corp., Waltham, MA.

Arnold Kraft, manager of corporate AI marketing, Digital Equipment Corp., Maynard, MA.

Gene Kromer, vice president of marketing, Intelligenetics, Menlo Park, CA.

Fred Luconi, president, Applied Expert Systems Inc., Cambridge, MA.

Joe O'Donnell, systems specialist, E.I. du Pont de Nemours & Co., Wilmington, DE.

Ed Payne, senior consultant, Arthur D. Little Co., Cambridge, MA.

Charles Rich, principal research scientist, AI Laboratory, Massachusetts Institute of Technology, Cambridge, MA.

Howard Shrobe, manager of VLSI development, Symbolics Inc., Cambridge, MA.

Junio Takashima, manager of corporate development, Computer Services Corp., Tokyo, Japan.

William Taylor, leader, Office of Advanced Systems, Gould Inc., Salem, NH.

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10 percent or 20 percent. We have a crying need for AI systems that can cut down the number of images, texts, and signals an analyst must examine. Automated map analysis is one promising area for AI in the government.

Taylor: The U.S. Defense Department is putting a lot of money into Carnegie Mellon University to develop devices that swim underwater to look for sunken objects. Defense is also interested in "bush" robots, possibly with legs, that can maneuver on their own over rugged terrain. The government is moving faster than industry in this work. The market in the United States for industrial robots is now no more than \$200 million a year. There are more companies making robots now than using them.

Simon Curry: An important new AI application is aiding in the design of computer chips. Designers who are already competent are being swamped by the rapidly increasing complexity of chip designs. Lisp machines, because of the very sophisticated man/machine interface they offer, can have a very significant impact on the way creative people do their work in chip design. Lisp ma-

Annual AI report

DM Data Inc. (Scottsdale, AZ) publishes an annual report on the artificial-intelligence industry. *AI Trends '84*, includes descriptions of the technologies and profiles of 50 key vendors and their products. Price: \$195. For information, call (602) 945-9620.

chines simplify the design process enormously, saving a lot of money.

Several of the participants also noted that AI techniques can provide management with valuable decision-support tools.

Ed Payne: At Arthur D. Little, we use AI to design automated factories. Once the fundamental application is explained, other groups within the user company become interested. For instance, the sales groups become interested, and say, "This is not just a design tool. This is a great marketing tool." Then the training people come in and say, "We can train people to use

these complex systems after we deliver them. It's a perfect training tool." Finally, the customer can test different ideas about how to run an automated factory. You can't take a large automated factory offline to test different operating scenarios, but you can get the same results using AI.

Luconi: In this regard, I would like to introduce the concept of an "expert-support system." An expert-support system is used to attack problems that are too broad and require too many subjective and intuitive judgments to be appropriate for a standard expert system. If the user already has a conventional decision-support system, you can add an expert-support system that can "talk" to the user and use the same tools he or she is already familiar with.

Rich: One problem that arises in many AI applications, such as decision support—I hesitate to say this—is that we try to replace people. Perhaps a better way to put it is that we are trying to clone people. Say we would like to have 100 people to accomplish a particular task. But we only have 10. The goal is to use AI to generate 90 clones. In many cases, that's too hard to accomplish right now. So we fall back on a productivity-enhancing approach.

Consider automatic programming. Instead of hiring 10 programmers, you hire two and get the other eight from a little metal box. But we can't do this, either, so we develop tools to assist programmers. As the next five to 10 years unfold, we hope the AI box will get smarter and smarter; eventually, we'll have a totally automated decision-support system.

Most businesses in the United States are still coming to grips with AI, if they're studying AI applications at all. The participants offered advice to executives trying to introduce AI into their organizations.

Qunio Takashima: The best advice I can give is to buy a piece of hardware, preferably a Lisp machine, and plunge right in. You'll learn by doing. To climb the learning curve, you'll need a piece of hardware to experiment with your ideas. Your first and

A sampling of AI vendors

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(617) 897-5111
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(408) 253-9600
Circle 413

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Circle 408

Symbolics
(617) 576-1043
Circle 414

Artificial Intelligence
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Circle 403

Intelligenetics
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Circle 409

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Circle 415

Cognitive Syst.
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Circle 404

Lisp Machine
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Circle 410

Teknowledge
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Circle 416

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Artificial Intelligence

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second projects will probably fail, but you'll probably succeed with your third. Keep the initial projects small to minimize your losses. But you'll have to experiment. I don't think there are set paradigms.

Harris: How you begin depends on the branch of AI you're getting into. In voice recognition, for example, you'll have to go back to the research stage. But in natural-language analysis or database-query analysis, off-the-shelf packages are available today. Each AI application is at a different level of commercial development. It's important for the end user to check this all out before getting involved.

Brown: Before an end user gets involved in AI, he or she should make certain there is strong management support for the project. If you're doing your own research, it may be six or seven years before you see a payoff. The second step is to get senior technical leadership, because there is no substitute for breadth and depth in AI. Personnel, not hardware, is the most difficult asset to acquire in AI.

Kromer: You'll have to get a commitment from top management for the investment to get the AI project started, primarily hardware purchases. Right now, the type of hard-

ware that is most usable is the Lisp machine. You'll need a few of these, and they cost between \$30,000 and \$100,000. But in three to five years—perhaps sooner—we will see Lisp machines priced at under \$15,000 or \$10,000.

Kraft: You'll need several different kinds of professionals. You'll want one or two AI experts, outside consul-

"You'll have to get a commitment from top management to get an AI project started."

Kromer, Intelligenetics

ants, a couple of pros with more general training who can just sit and write code for long periods, and most important, an expert on your own company's business who is willing to have his or her expertise reduced to a set of rules. For instance, if you're in oil exploration, you'll need someone who really understands how to do that. At DEC, when we developed our Xcon [Expert Configurator] system, we needed an expert on putting the pieces of a VAX together.

The other important issue is scaling the problem. You can't start off with an enormous problem and hope to define it. You need to start with a very small subset of the problem, a representative part of the overall problem.

Payne: When you're getting started in AI, a consultant, like my outfit, can only do so much. We often say to management, "This is the direction you should be taking." We back someone in the company who has a spark of interest in AI. Such persons have either been directed by top management to look into AI or they've grown interested in it on their own.

Luconi: I see organizations that are still three generations behind in traditional technology trying to jump on to the AI bandwagon at the research level. While this can be a problem, an even bigger problem can be the attempt to jump right into an AI operational application. This is an altogether different kettle of fish. You'll need some really hard-nosed systems managers who will stay with the problem over many years and really work out the details so it can become functional.

Who should make these leadership decisions in corporations? The

(Continued on page 108)

An AI glossary

Apprentice: A simple expert system that helps a human expert resolve complex technical questions, step by step. Applications are in oil exploration, locomotive repair, and medical diagnosis.

Automatic programming: A program specification or design is automatically translated into a working program, with minimal operator intervention.

Expert system: A system that assists or replaces an expert to solve problems.

Expert-support system: Similar to an expert system, but often used in conjunction with decision-support systems to solve problems by examining subjective, intuitive factors, as

opposed to formal rules.

Fifth-generation: A computer or system specifically designed to solve AI problems. May also refer to a supercomputer.

Lisp: Short for list processing, a new computer language especially designed for AI applications. Lisp is the most significant AI language in the United States.

Lisp machine: A processor especially designed to run Lisp software. Lisp machines are offered by only three vendors, LMI (Cambridge, MA), Symbolics (Cambridge, MA), and Xerox (Palo Alto, CA).

Natural language: A computer equipped for natural-language analysis can be addressed in ordinary

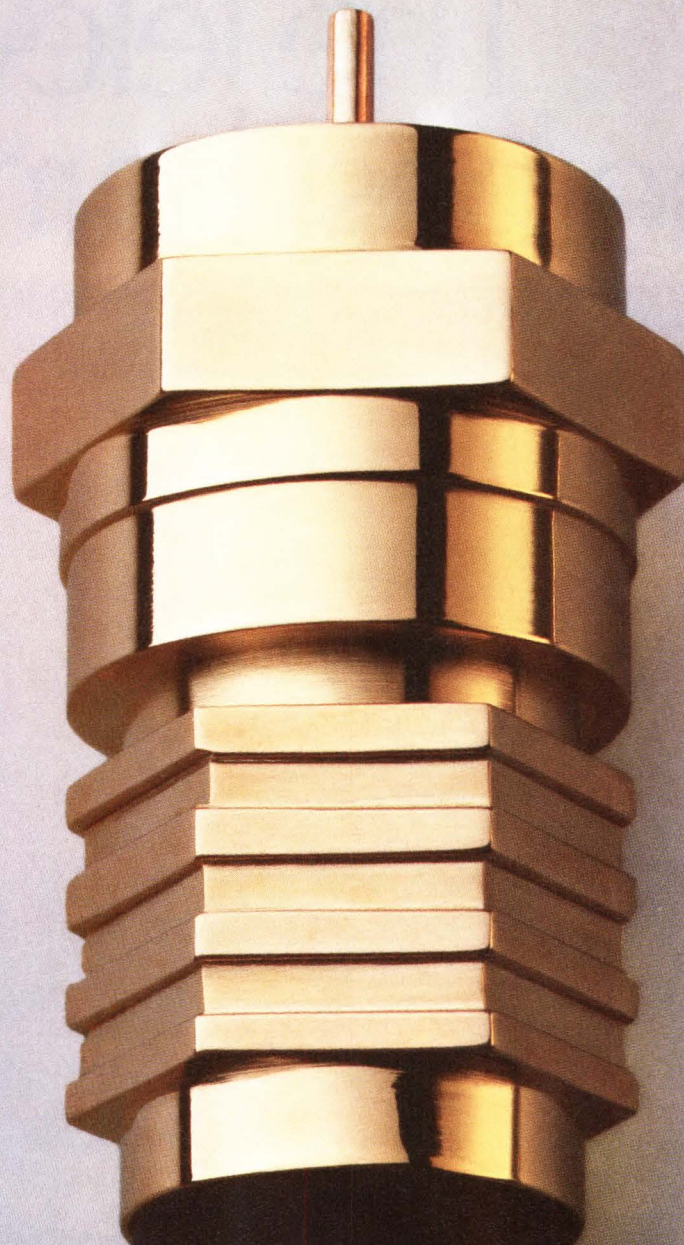
language instead of computer terminology.

Prolog: Short for Logic Programming Language, the AI programming language most popular in Japan.

Robotics: Anthropomorphic devices, such as artificial arms or hands, that can perform human functions on an assembly line or elsewhere.

Vision recognition: In this discipline, an AI computer can recognize a TV image of a dog and say (or print out), "It is a dog." Recognizing images is a very complex process for machines.

Voice recognition: An AI technique that allows a computer to understand the human voice.



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Artificial Intelligence

(Continued from page 104)

CEO, the president, or the MIS/dp manager?

Taylor: One of the major mistakes we have found in AI projects is too much planning. There are a lot of ad hoc moves you have to make to ensure the success of an AI project. Commercial applications of AI, right now, are at the point Balboa was at when he climbed a tree in Panama and saw the Pacific Ocean. He didn't immediately rush back to Spain to raise venture capital to build condominiums in California. In AI, there are a lot of steps along the way that aren't being taken. We are trying to move very fast in AI.

Payne: One of the worst calamities we have found in startup AI projects is companies hiring a lot of computer scientists. These companies come to us hurting, because the scientists really don't know anything about business. Also, everyone else in the company is suspicious, having been burned two or three times by the promises of computer scientists. There's a real lack of trust and communication.

Howard Shrobe: The warning against

computer scientists in AI has to be read a little carefully. You want individuals who are not too steeped in conventional computer-science disciplines because AI programming is different. Rather, you need pros who are very good at writing Lisp code, enjoy interacting with other people, and can understand very difficult problems.

Taylor: You need to hire or find in your company someone with fire in his or her belly to get the project done. Because AI is razzle-dazzle, there's no standard course for it. You need someone who will do anything, go over, under, around, or through the obstacles, to get the work done. That's where management's responsibility lies. Management has to say, "You, corporate freak, we want this problem solved. Do anything required to solve it." Management has to maintain the focus on the problem, and make sure there is a payoff. You have to let some really crazy people do whatever is necessary. It's like the Harlem Globetrotters School of Programming.

Kraft: You also have to be ready to encounter resistance. I fought resis-

tance to our VAX-configuration project tooth and nail every day. Other individuals in the company will look at AI and be scared of it. They say, "AI is going to take my job. Where am I? I am not going to use this. Go away!" Literally, they say, "Go away!"

Selling management on AI will depend on proving that it can streamline operations and cut costs. AI has been in the lab for a long time now. When will it boost the bottom line?

Brown: A Lisp machine can cost as much as \$100,000. A professional employee costs about the same, if you include benefits and support costs. If you can double that pro's productivity by buying him or her a Lisp machine, doesn't that start to make sense? It seems to me that AI techniques can save you money in the first year.

Creeger: Enhancing software productivity can also be a money-saver. As one professional in a brokerage house told me recently, "We have offices in every major city in the world, but for the most part, our business is really driven by 15 guys locked up in a room in downtown New York. They decide which bonds to buy, and they really chart the strategy of the business. All our thousands of employees are largely executing the direction set by these 15. Anything we can do to leverage or enhance their expertise, for example, using AI techniques, is going to greatly affect our company."

Harris: You don't save money explicitly by using AI techniques. Rather, you save money by solving problems that were previously unsolvable. Our product, Intellect, and natural-language analyzers in general, make savings possible by validating earlier investments made in building up the database and in getting data out there.

Until now, we've been getting the ball down to the 5-yard line but failing to score by delivering the data to the decision-makers. Thus, users have not been getting the real benefit of all the previous investments in information technology. Natural languages close the gap. Users have cost-justified the installation of Intellect simply by cit-

Short AI bibliography

The books and magazine articles listed are generally nontechnical and appropriate for executives.

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Artificial Intelligence

(Continued from page 108)

ing the number of regular reports that were eliminated because executives taking advantage of ad hoc query capabilities no longer needed them. Those executives go online and get the information they need directly.

Payne: Our clients are more worried about surviving than saving money. They have problems they can't solve now. AI provides a way to solve new, much more difficult problems in the future. Many of our clients look at AI as a long-term investment.

Kraft: With our two proprietary AI systems, Xcon and Xsel [Expert Selling Assistant], we have saved more than we have invested, strictly in a cash-flow sense. However, measuring the return on assets and investment has been very difficult. The fact that the whole ordering cycle is correct from beginning to end makes a lot of business sense, even if you can't quantify it. And if you are able to do your scheduling faster and more accurately, you'll see another improvement that's hard to quantify.

From the beginning of my AI project, I had help from financial pros. We did an assessment at the beginning of the program and took a look every six months thereafter to see if we'd made progress against a set of benchmarks. You have to give top

management some indication of how you are progressing.

Taylor: I disagree. Measuring what you have in the beginning and what you've accomplished after every six months is a good way to get an AI project killed. You may not see any improvements along the way. It's essentially a gut-feeling gambit. It's a crap shot by management that AI is

"If you're doing your own research, it may be six or seven years before you see a payoff."

Brown, Mitre Corp.

going to pay off. Until the project is operational, you won't be able to tell how much you are saving.

Kraft: I contest that. DEC's culture did not allow a project to go on under a blanket of secrecy for two years and then pop up complete. You had to show you were making progress in any way, shape, or form you could. We had to show that at least a few more people were using the system, or that some small savings had already been realized. We had to go by the numbers.

Harris: We market Intellect on a test basis. Our customers put Intellect into their own applications. If, after 60 days, they can't justify the \$70,000 investment in the product, they can cancel their obligation. But, because our customers are able for the first time to directly work on the computer

as an effective tool, virtually all our test installations become purchasers of Intellect.

Kraft: AI techniques let the user get more information and exercise better and more timely judgment. Much of the improvement is qualitative. How do you measure that?

Taylor: Consider what happened when electronic data processing first came in. Companies didn't cut their costs as they installed dp equipment. They actually added staff. But they claim they got better books—once they managed to get the confounded books to balance. Similarly, studies have shown that when a company puts in a word-processing system, the cost per word produced goes up by about 60 percent. So, in a dollars-and-cents sense, most high-technology innovations do not immediately pay off. But these innovations help executives run a business better.

There's a lot of speculation about the AI projects IBM is cooking up. Many small vendors are offering projects, but what's Big Blue up to?

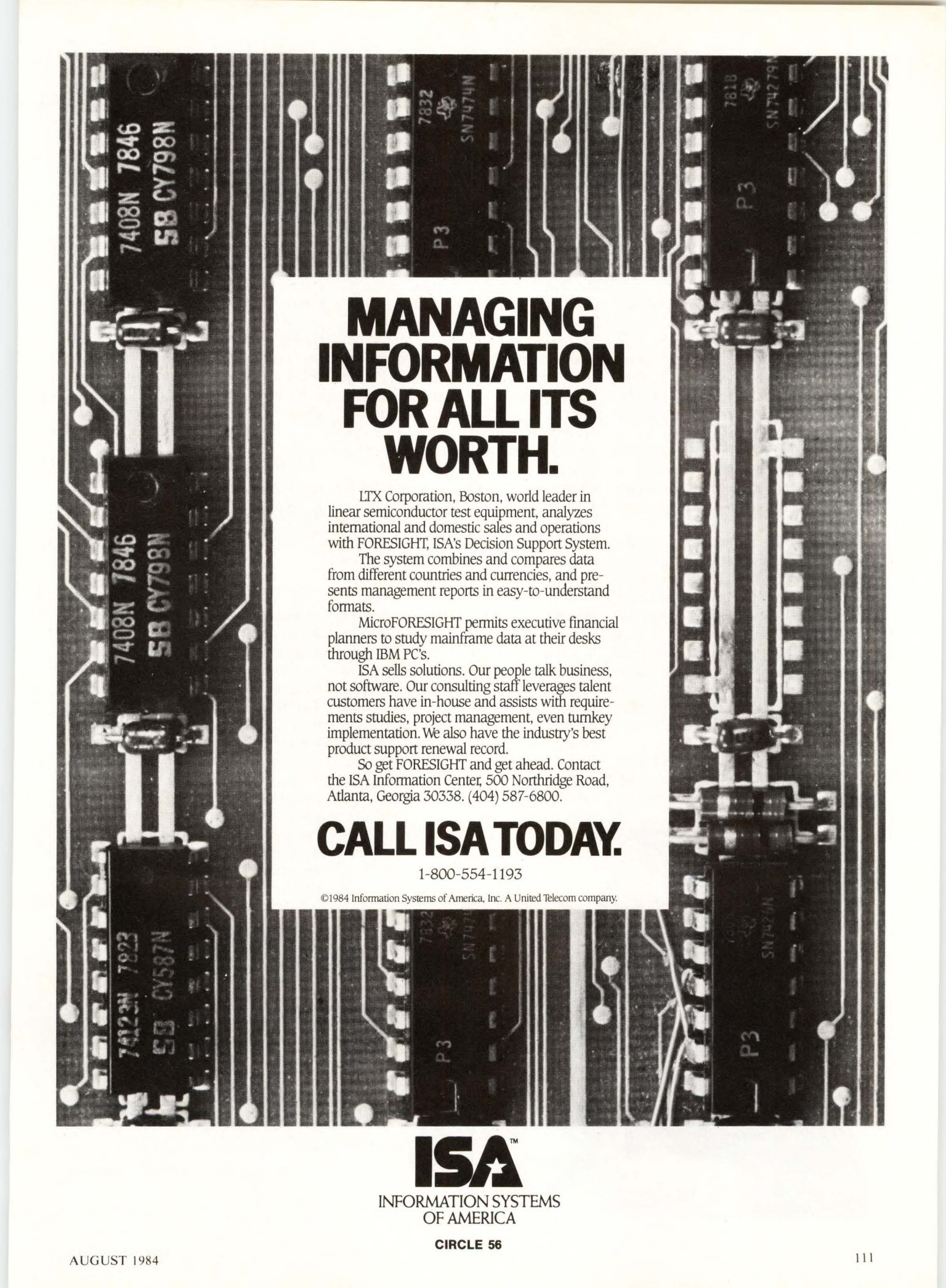
Taylor: IBM is the "black hole" of AI. A lot of very good AI researchers have disappeared into IBM. They attend conferences and they read all the papers, but they don't say anything and they don't write any papers. My guess is that IBM will do what it usually does: It will wait until the direction is plain, and then throw scads of money into AI when it gets to be a billion-dollar-per-year business. That's the same strategy that proved successful for IBM in personal computers.

Barrett: IBM is keeping a low profile, but is constantly monitoring the progress of developing AI systems. It



"Our employees are more worried about surviving than saving money."

Payne, Arthur D. Little



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CIRCLE 56

Artificial Intelligence

(Continued from page 110)

will be able to make its move when the time comes.

Much attention has also been focused on the Japanese and their fifth-generation project. What impact can the Japanese be expected to have on future AI applications?

Taylor: The Japanese technique, after identifying a market they want to get into, is to do something different. The Japanese effort in AI is being spearheaded by the Ministry of International Trade and Industry [MITI]. Whatever they make, it won't be another form of IBM-compatible hardware so, if it works, the Japanese will have the market to themselves for a while. The only unpredictable factor now is how big that market is going to be.

Takashima: One of the more immediate goals of the Japanese fifth-generation project is to come up with a machine-aided method of translating Western languages into Japanese. Translation into Japanese can be a very difficult process, particularly in technical areas, and Japanese scientists and engineers are often unable to gain access to all the information that is available to their Western counterparts.

Taylor: As far as actual AI programming languages are concerned, the Japanese are emphasizing Prolog,

a high-level programming language. In this country, we're concentrating on Lisp. The extent of the Japanese success in their AI project will depend largely on whether Prolog is the "magic language." If it should turn out that Prolog is the right way to go in AI, the Japanese will get there first. The Japanese have a very tightly organized team climbing one mountain. We in the West, on the other hand, are climbing a lot of little hills. If Prolog is not the right way to go, we will find the solution first, simply because we are exploring so many different areas. In the last analysis, you pay your money and you roll the dice.

Rich: However, there is quite a bit of Lisp activity in Japan, and there's a fair amount of Prolog activity in the United States. It would be an oversimplification to say that Japan is doing Prolog and we are doing Lisp, and we'll see who wins.

Shrobe: We are creating a very big misconception here. Japanese vendors like Hitachi, Fujitsu, and NEC compete very fiercely with each other. Yet they find ways to collaborate through such organizations as the Institute for a New Generation of Computer Technology [ICOT]. American AI vendors like Symbolics and LMI have Japanese distributors—they talk about tearing the other guy's jugular out.

But still the Japanese manage to cooperate very successfully in such groupings as MITI and ICOT. So the fact that we have a tradition of intense industrial competition in the United States need not rule out successful collaborative efforts here.

Curry: When I was in Japan recently, one of our Japanese consultants was trying to help us understand the research-and-development atmosphere in Japan. He came up with a word I like: "coopetition." This is the idea that traditionally fierce com-

"One of the major mistakes we've found in AI projects is too much planning."

Taylor, Gould

petitors are prepared to cooperate to develop new ideas with the full understanding that they will be going into competition again as soon as the research phase is over.

Taylor: American managers have to bear in mind that the Japanese have seen desperate times. They were starving in the late 1940s and early 1950s. Someone once said that the threat of pain concentrates a person's mind. Now we're feeling a little of that pain. The guys at General Motors are saying, "We're doomed if we don't get into AI." You couldn't get AI in the door if GM wasn't desperate. AI is hairy and flaky, and GM has barely digested its dp flakes. Now, here's a whole new kind of flakes that are even worse!



"I fought resistance to our VAX-configuration project tooth and nail."

Kraft, Digital Equipment

Takashima: I see a "grass-roots" approach to AI in the United States. Small ideas come from the bottom, from garage operations and similar setups. It may seem naive, but at least it is practical. In Japan, the initiatives come from the top.

Taylor: AI experts talk a lot about search algorithms. One of the ways to win is to blanket the search space and search every point. That is what the grass-roots approach does, and you see which blade of grass gets to the top.

Many observers believe AI will blossom for business during the next decade. The participants believe that's a good guess. They expect to see today's ideas applied in many ways.

Harris: In the next 10 years, we can expect to see some very exciting AI applications, and they'll use existing technology. AI concepts will be wed to conventional databases, decision-support systems, and spreadsheets. Also, we'll see AI play a more important role in developing the computer as a tool. In particular, the computer should become almost invisible in terms of how the ordinary employee uses it. This means not just user-friendly or friendlier, but literally invisible. This task will only be accomplished by using AI techniques—in particular, natural-language techniques.

Kraft: We'll see some standardization of the AI tools in the next few years. We'll see common Lisp and common Prolog, as we now have common Fortran. This will help AI to spread; many more vendors will be able to offer the tools, and that will help drive

prices downward. Eventually, we won't be able to distinguish between AI and conventional dp. AI techniques will make everything much easier to do. The computer will be as ubiquitous as the phone. You'll know, it's there and you'll use it.

The U.S. government has fueled AI research for years, but some participants argued that the public sector should give way to private-sector development efforts. The future of AI cannot continue to be so strongly linked to national security, they said. Others disagreed.

O'Donnell: The government should probably not do anything to promote AI. Leave it to private industry. That's where most of our success has been.

Taylor: When the government tries to do something directly, it usually fails. Indirect solutions seem to work best. If the government really wants to encourage AI, it should fund the space program, because that's how we got high-density integrated circuits. We wouldn't have today's AI applications without integrated circuits that let users buy a piece of AI hardware for less than \$100,000.

Barrett: The Defense Advanced Research Projects Agency [DARPA] supercomputer project bears directly on the development of AI. The DARPA effort is very well-intentioned and has been around a long time. It is accelerating now. It is directed toward building the AI infrastructure, helping universities with equipment, and helping them train and retain professors. The Defense Department must develop AI systems for signal processing, for image pro-

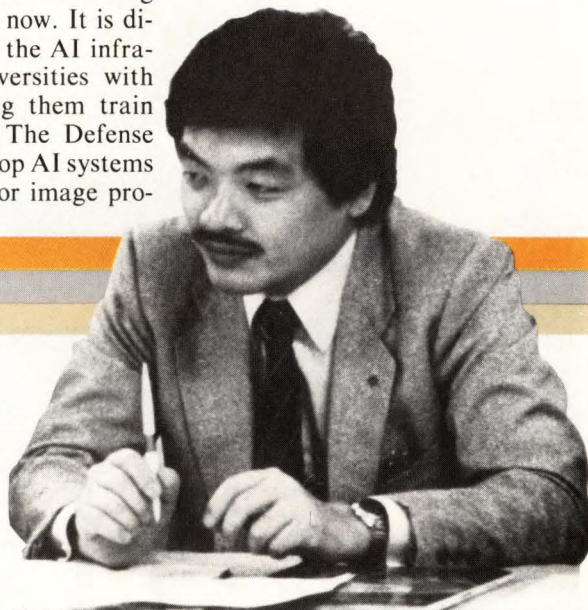
cessing, and for decision support in order to protect our national security. These efforts will be successful.

Shrobe: It's true that there would be no AI today without government funding. But something new happened during the last year in the Strategic Computing Program, and I am not happy about it. SCP is a very large program, administered by DARPA. For the first time, the government has mandated support of some fairly explicit military goals, rather than basic research. This skews AI research, which will follow the dictates of the funding source. The government should also fund large amounts of nonmilitary research through a different agency. Otherwise, we are going to leave behind some very good efforts in other, nonmilitary, directions.

Rich: DARPA supported us when we were graduate students at MIT, and we should be thankful. Was it all worth the effort? If we in the AI community sound confused, it is because we are confused. AI is a very young field. We are, at most, 25 years old in terms of a serious research effort, and only two years old in terms of practical applications. That immaturity shows in all kinds of ways, but we're doing very well. We are accelerating, but everyone has to tolerate a lot of confusion. □

"The best advice I can give you is buy a piece of hardware and plunge right in."

Takashima, Computer Services

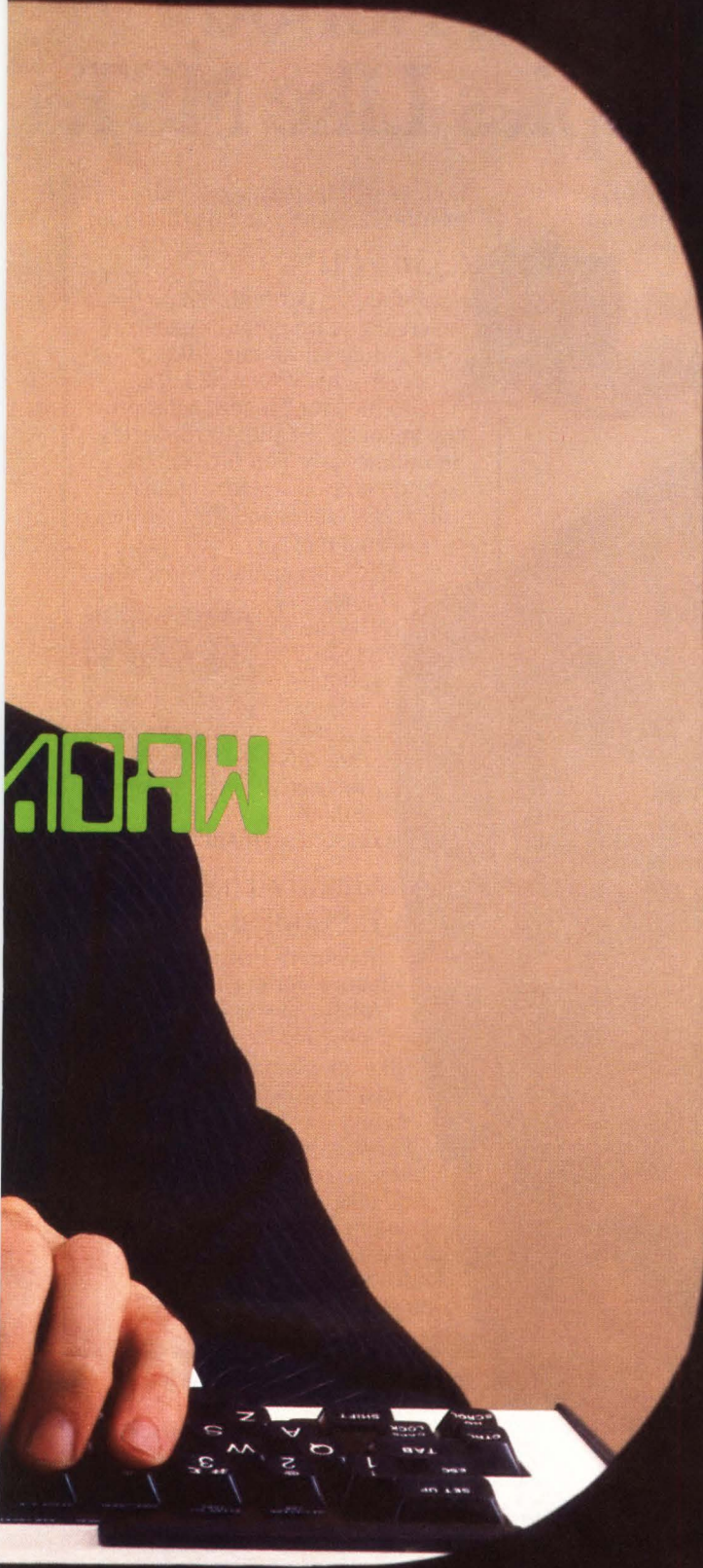




!KNOAW !KNOAW !K

Photo by Rick Barrick

USER-SURLY



Far from being a waste of memory space, software friendliness makes learning new programs easier and faster.

by Susan Foster Bryant, Microsystems Editor

"No programmer writes an unfriendly program on purpose. If some of us write unfriendly programs, it is not because we want to; it is because we do not know how to do better. . . ."

So says Paul Heckel, author of *The Elements of Friendly Software Design* (Warner Books, \$8.95). An engineer and writer, Heckel contends that user-surly software—that stuff that gives you hives whenever you turn on your computer—is the result of an inability of software designers to communicate: "We select computer functions and data structures according to how interesting the program we build will be. If we think of any user at all, we think of ourselves. Much of this is done subconsciously. Only as an afterthought, if at all, do we think about communicating our concepts to the users."

What's a manager to do? The majority of available software is very difficult to learn. The manager no longer feels in control; rather, the *software is in control*.

Nothing is as devastating as an error message like "illegal entry" or some other wording that evokes feelings reminiscent of "Go to jail. Go directly to jail." How much more polite for a program to speak gently to us, as in "Please insert a formatted disk in Drive A."

Time will change software design as more nontechnical people become computer literate, removing the writing of software from the domain of engineering expertise and placing it in the realm of everyday business use. Until that time, however, there are some fundamental ways you can avoid or minimize costly software-purchasing mistakes.

Obviously, you or your subordinates should first consult unbiased users, such as friends, colleagues, or professionals staffing the corporate information center or in-house computer store, before buying a package.

(Continued on page 117)

SOFTWARE

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User-surly Software

(Continued from page 115)

However, such resources may not be available, or the package may be so new that no colleague has yet used it. Sometimes you can find a review of the package in one of the many periodicals devoted to personal computers. Unfortunately, too many of these "reviews" are nothing more than endorsements of advertisers' products.

If you or your subordinates must depend on your own resources, begin by reading the documentation. Don't buy software without such a prior examination, even if it means spending an hour or so at your corporate information center or a local computer store.

Review the manual. Is it easy to follow? Is it easy to read? Is it a professionally designed and printed in-

User-surly software is frequently the result of an inability of software designers to communicate.

struction manual, much as you might get with, say, a food processor? Or is it typewritten, quick-copied, and jumbled? Does it include a detailed table of contents and an index? Are there sections to the manual separated by tabs for easy reference or are you going to have to search through the entire manual every time you need help? Are there clear photos of screens to let you know what you can expect your screen to look like?

Now, load the program. Start working through some commands. If the manual has a tutorial section, work through that section as well. (If not, caveat emptor.) Then jump in—start running the program.

Look at it this way: The documentation is your map. If you get the impression that there's a lot of unexplored territory, backtrack fast to the rack you got the software from. You're not ready for uncharted programmer provinces.

The manual should open with a complete description of what the pro-

gram can do for you (not how it does it). You should be able to see from this section whether or not thought and effort have gone into the organization of the material. Is this manual going to get you where you want to go—and quickly? Or is it going to be like dBase II and Wordstar, which are akin to renting a car in Russia, only to find the road map written in Sanskrit. (Both dBase II and Wordstar remain very popular programs, despite their surliness. They appeared early in a market that was so hungry for a good database manager and word processor that users muddled through them. This situation has begun to change, however, as friendlier programs such as Multimate and Framework start to appear. In fact, you can learn more about how to use the IBM Personal Computer from the Multimate documentation than from the IBM PC documentation.)

A friend in need

Also to be looked for in "considerate" documentation is a quick-reference booklet or card (a short and concise summary of commands) and a troubleshooting guide, which is very helpful should something go wrong. In some cases, this guide will contain a list of error messages. (If your documentation does not contain a list of error messages, and you still decide to use the package, make up your own list. You'll probably need it.)

You'll also need a tutorial section. More experienced computer users view tutorials as unnecessary reviews of known facts, but novices depend on tutorials. Good tutorials explain the main program commands and features, teaching you how to do such tasks as creating mailing lists from database management programs.

Another important aspect of documentation—according to some—is on-disk tutorials, which some manufacturers have started to include in their software packages. These teach you a program via a separate instructional interactive disk, which also serves as an introduction to the program.

Lastly, documentation should give



you specific information regarding the vendor's support policy. Does the vendor have a toll-free telephone hot line for questions or will your dealer be "on call" for you? Is there a registration card that will guarantee you future information about program updates and correctly identify you should you need a replacement copy of your program? Is there a clear policy regarding what the vendor will do if your disk is defective or if you damage it? Are the warranty terms satisfactory? Don't assume that software vendors stand behind their products the same way other manufacturers do. Consider, for example, this "warranty" from Multimate:

"The program is provided as is without warranty of any kind, either expressed or implied warranties of merchantability and fitness for a particular purpose. The entire risk as to the quality and performance of the program is with you. Should the program prove defective, you (and not Softword Systems Inc. or an authorized dealer) assume the entire cost of all necessary servicing, repair, or correction." Feel like you're protected?

Is a friend indeed

One final word about documentation. If you're sure you or your subordinates need a particular program (or if it's the only one in its category your employer will allow you to buy) and if you're sure the documentation will be of little value in helping you through the program, you have two last resorts: Attend seminars or read a book about the program. (Many popular packages are the subjects of books.) This will ease you through the learning process. The initial investment in learning time can yield great benefits in effi-

(Continued on page 120)

COMING NEXT MONTH

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User-surly Software

(Continued from page 117)

ciency and effectiveness.

Finally, some vendors (Cdex, Los Altos, CA, for example) offer separate programs that teach programs. This method of learning may ultimately prove to be the most successful because the student is learning in the same medium in which he or she will be working.

Show me

In the ideal software-buying situation, you will have an opportunity to (a) review the product brochures, documentation, and magazine reviews and (b) have a software demonstration.

The latter may not be easy to arrange. A thorough demonstration of a business-software program will take

Don't assume that software vendors stand behind their products the same way other manufacturers do.

no less than an hour, and many retail salespeople are hesitant to devote that much time to potential sales. That's why specialized software distributors that devote themselves to supplying "approved" programs to large organizations may prove to be more supportive of managers and professionals who are not sure what they need.

On the other hand, the smarter salespeople know that by giving you the demo, they will very likely be gaining your trust, confidence, and future business. Astute salespeople can also help you ascertain, at the demonstration, whether or not the program in question is really suited to your needs. What they *don't* want to sell you is software that is going to require a great deal of after-sale support from them.

Assuming you can arrange a demonstration, several key points should be remembered. First, arrange for the demonstration to take place on a system set up *exactly* like your own, including the same single- or double-

sided disk drive, monitor, add-on boards, memory, and printer. Make sure that a hard disk is not being used in the demonstration if you don't have one of your own, because the program will run much faster with a hard disk. If the program is on a hard disk, it's only a minor inconvenience for the salesperson to copy it onto a floppy.

Make sure you won't need additional equipment to get the program running. Do you need to buy another operating system or graphics board, modem or communications card?

Measure for measure

OK, now you're ready to test the program. You've previously reviewed the documentation (remember, this is the ideal purchasing situation). You're about to make a trial run. Your salesperson leaves you alone (but stays within shouting distance should you have a question).

Many experienced users recommend that you start to use the program without referring to the manual. *How far you get is a true test of the software's friendliness.* It's more polite (or thoughtful) for a program's prompts to consistently appear in one place on the screen so you don't have to hunt for them. Obviously, you will not get out of neutral unless the program is menu-driven. (A command-driven program will do nothing until you tell it what to do, which is frustrating until you become familiar with a program's commands.) You will make your choice from a "main menu" and access the portion of the program you want to enter.

Some programs have only one menu. Others have sub-menus that further chart your course through the programmer's maze. This presents another programming paradox: When you first learn a program, you want all the help you can get, but when you know the program, the menus impede your progress. You wouldn't consult a road map if you knew where you were going.

Micropro is one software vendor that has solved this problem by giving the user the option of having a "help" menu always displayed at the top of

the screen. You can "set" the program when you load it to give you extensive help menus, abbreviated help menus, or no help menus.

You've got the program up and running. You're beginning to get a sense of its personality. Now you want to get its goat. See how angry you can make it, at the same time testing your own frustration quotient. *Do everything wrong that you possibly can.* Find out how this beauty is going to respond if you make a mistake after you acquire it. Hit keys you're not supposed to hit, those not on the menu. What happens? Hit the return key when you shouldn't. What happens? Hit several keys at once. Hit the escape key when you shouldn't. Hit the reset key before you exit the program.

"If we think of any user at all, we think of ourselves. Only as an afterthought do we think about users." *Heckel, author*

Type in longer-than-allowed file names. Try to load nonexistent disk files. What happens if you type the commands too fast?

How does the program react to such goading? The well-designed program will be prepared for them. Sufficient "error-trapping" routines will have been written into the program to tell you there's a problem—and offer a solution.

There are those who argue that user-friendliness in business software is nothing more than a waste of memory space. Being friendly simply takes up too much room. This may be true for those who are truly proficient at the intricacies of program detail, but those of us for whom learning new programs is not that easy thank the software designers who have considered our "mechanical disinclinations." As Paul Heckel so aptly states, "Users expect that programs will not judge their use of them, but will help them overcome their problems in using them." □

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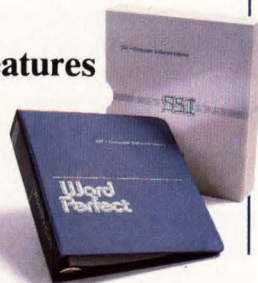
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SSI

Prima donnas: Living with them when you can't live without them

They can be both gloriously gifted and abominably abrasive. The prima donna you'd rather not do without can unnerve everyone.

by Martin Lasden, Western Editor

Not all geniuses are jerks. But if you happen to be a jerk, genius can be a tremendous asset. When you can contribute so much to an organization, a multitude of sins is likely to be overlooked. You can be rude and repeatedly see your rudeness go unchallenged; you can be tactless and see your tactlessness go unchecked.

Life can be easy on the gifted or truly brilliant. But, as prima donnas seem to be governed by a different set of rules, life becomes extremely difficult for managers who are responsible for keeping these characters in line. And, while frazzled managers might find comfort in reminders that no one is indispensable, having a supercharged brain on board can be addictive. These pros have the potential to save the irretrievable and solve the inextricable. And, after all, your





employees are a reflection on you. Doing what ordinarily can't be done is good for your career, even if more than occasionally you rely on a brilliant subordinate. It can be tough to relinquish a prima donna's formidable talents.

Richard Sorken, vice president of development services for the Bank of California, San Francisco, remembers the time a major software-development project was going down the tubes, plagued by seemingly insurmountable technical problems. That was when, at the 11th hour, he called on Hal, considered the organization's programming genius, to save the day. Many also thought Hal to be opinionated and abrasive, with a knack for alienating co-workers. But, God, was he brilliant—with a mind that could leap through stacks of technical minutiae in a single bound. "Hal turned that project around within 48 hours," Sorken recalls. "He worked 20 hours the first day and 16 hours the next. The users were ecstatic. I can tell you, he'd have to tick off an awful lot of people before I'd get rid of him."

Such is the stuff of ecstasy. But for these moments of ecstasy, how many hours of agony and assaults on staff morale should a good manager bear? Robert Jirout, vice president of information services at the Chicago Board of Trade, puts a limit on the amount of guff he'll take from a prima donna. He remembers how ornery one of his technical hotshots was. "In a single day he could get $2\frac{1}{2}$ times more work done than anybody else," Jirout says, "but he strutted around like he was a god of the technical world. And when he disagreed with you, he'd let you know about it—over and over again." When the superstar caused embarrassment by protesting an internal policy in front of a prospective client,

Prima Donnas

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however—he'd gone too far. "I walked him right to the door and took away his key," Jirout recalls. "At that moment, I didn't care how difficult he would be to replace."

Riding on the horns of this dilemma, managers have three options.

There is, first of all, the preemptive approach—tailoring employee selection methods in such a way as to prevent prima donnas from ever being hired in the first place. James Tunis is probably typical of those who advocate this approach. As vice president of corporate services at Lincoln National Life Insurance Co., Fort Wayne, IN, Tunis has been burned one too many times. "Too often," he says, "I've essentially been blackmailed. Projects would get to a critical point, and then the prima donna in the group would say, 'Either do it my way or it won't get done.' For a manager, that's a terrible spot to be in."

To guard against this, Tunis now does a lot of what he calls "inoculation" during job interviews. "I do my share of selling," he says, "but I also make it a point to tell prospective employees about the crummy side of the job. I'll tell them the work is not all creative, or traveling is involved, or programs need to be written in Fortran once in a while." Such honesty discourages the most troublesome geniuses from ever getting on the payroll, Tunis says.

That's not to say that all geniuses are rejected. But when it comes to the best and the brightest, Tunis expresses a distinct preference for the very young, and, in fact, actively recruits gifted college students for part-time winter and full-time summer work. "They're just as smart as the prima donnas," he asserts, "but unlike prima donnas, they're hungry, highly motivated, and haven't yet learned just how indispensable they might be."

For managers who are more dazzled by brilliance than fearful of turmoil, the second obvious alternative to keeping prima donnas out is to welcome them aboard and then work with them to smooth their roughest



edges. Douglas LaBier, a psychoanalyst and senior fellow at the Washington-based Project on Technology, Work, and Character, observes that all too often managers unwittingly reward the sadistic and/or grandiose behavior of their hotshots because they are too afraid to call them on it. But attacking the offensive behavior head-on with diligent counseling, LaBier insists, can bring about meaningful improvements.

A case in point occurred at a large computer company LaBier worked with recently. There, a female manager had under her charge a technical wizard with an extremely autocratic manner. After an extended period of uncooperative behavior, she decided to take the initiative by stressing the need for teamwork: If people didn't work together, the work just couldn't get done. Because the manager expressed this message often and stridently enough, the star performer became markedly more cooperative, LaBier reports.

But even under the best conditions, behavior modification is a tenuous proposition—especially if the behavior in question is deeply rooted in the offender's personality—the product, perhaps, of years of conditioning. Exploring the inner workings of the abrasive mindset, psychologist Harry Levinson has suggested that just beneath the bravado of the prima donna, there likely is a terribly insecure person—a perfectionist whose lack of self-esteem is constantly reaffirmed by his or her inability to attain out-of-reach goals. In an article entitled "The Abrasive Personality,"

which appeared in the *Harvard Business Review* (May-June 1978), Levinson wrote:

"If a person is always pushing himself toward impossible aspirations and is never able to achieve them, there are two consequences for his emotions. The greater the gap between his ego ideal and self-image, the greater will be both his guilt and anger with himself, for not achieving the dream. And the angrier a person is with himself, the more likely he is to attack himself or drive himself to narrow the gap between his ideal and his present self-image. Only in narrowing the gap can he reduce his feelings of anger, depression, and inadequacy.

"However, as the unconscious drive for perfection is irrational, no degree of conscious effort can possibly achieve the ideal, or decrease the self-punishment such a person brings down on himself for not achieving it. The anger and self-hatred are never-ending, therefore, and build up to the point where they spill over in the form of hostile attacks on peers and subordinates, such as treating them with contempt and condescension.

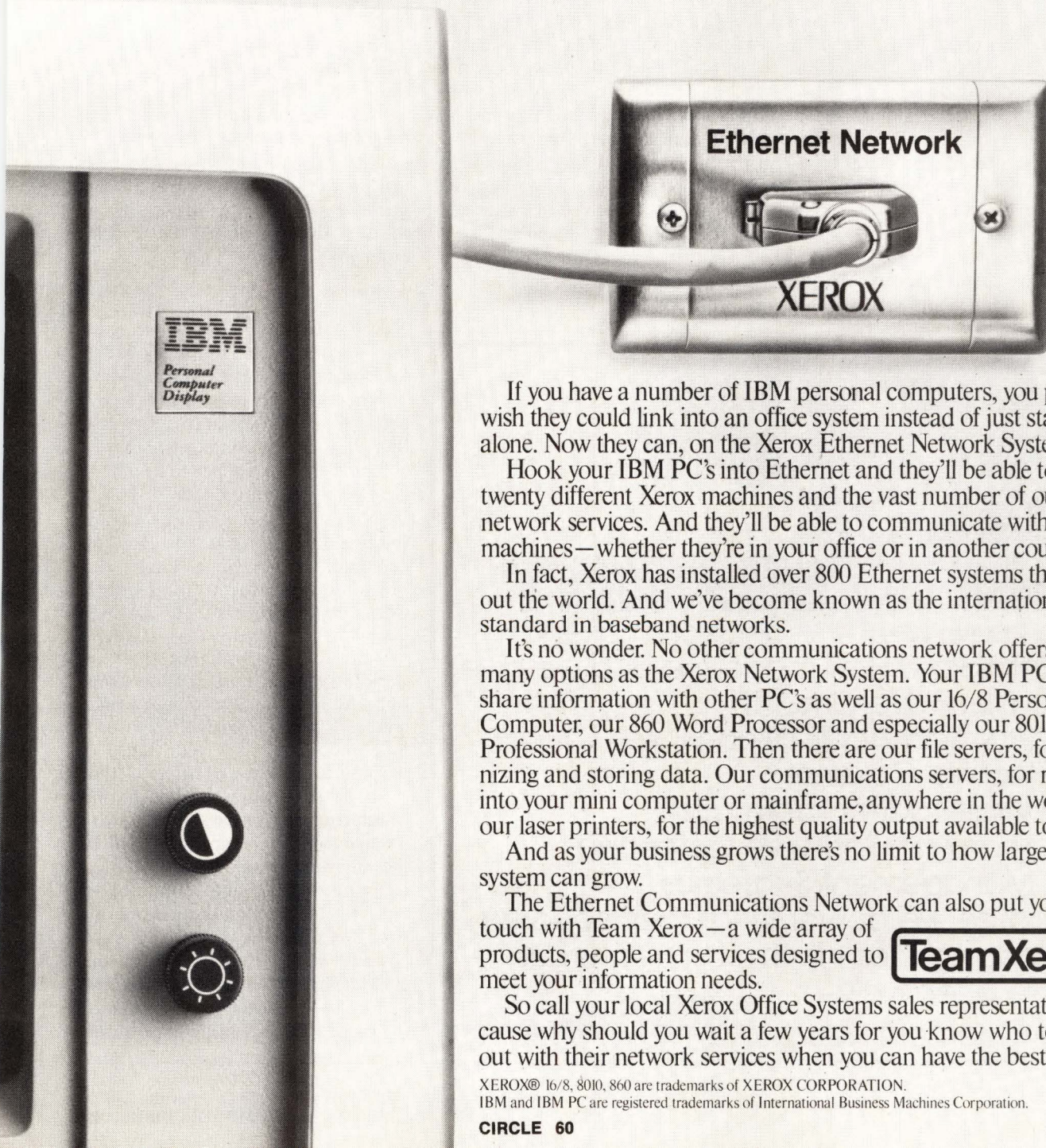
"... In fact, the abrasive person's need for self-punishment may be so great that he may take great, albeit neurotic, pleasure in provoking others who will subsequently reject, that is, punish him. In effect, he acts as if he were his own parent, punishing himself as well as others. In the words of psychiatrist Anna Freud, he becomes a good self-hater."

Needless to say, the person Levinson described has serious problems; unless you're a trained psychotherapist, the prospects for reforming such an individual are not promising. This suggests a third option. Not to ban or change the hotshot, but rather to very carefully select assignments where he or she can do the most good while causing the least harm. In other words, what you want to do is isolate the superstar.

"The ideal is to put your prima donna in a separate building, preferably one without heat or water," says Herbert Halbrecht, a Stamford, CT,

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Prima Donnas

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headhunter who has dealt with his share of technical geniuses. "They thrive under harsh conditions," he notes. "And when you put these people together, they attack problems with an almost fanatical determination. They're crazy! They're consumed by their creative talent."

Such vacuum-sealed environments, however, are not easy to come by, and often difficult to create. At the First National Bank of Boston, senior vice president William Synnott talks about the time he tried—and failed. "I never could find a niche for this one particular fellow," he recalls. "This guy could do almost everything. He had a great mind. But he was extremely rutted in his opinions, and during meetings he would try to ram those opinions down people's throats. I tried to isolate him by having him report directly to me, but in the end I had to let him go. He grated on too many people's nerves. My own managers didn't want to deal with

him. I couldn't protect him."

For bosses to protect their socially inept geniuses, certain conditions must be met. One area of concern is organizational structure. Is there a way to work around these prima donnas so that they cause the least possible offense? At Digital Equipment Corp. (DEC), in Maynard, MA, Al Crawford, director of corporate planning, accomplishes this by creating small special task forces set apart from the rest of the organization. The key, Crawford says, is to establish an organizational "buffer"—a structure that is effective all the way down to the infrastructure of specific jobs. Where a certain job might ordinarily entail user contact, for example, if there's an asocial prima donna involved, bosses would be well-advised to break up that job so that user contact is delegated to someone else.

Another critical question to consider here is: When you need a genius to get a job done, who should be the

genius' teammates? The best answer is other geniuses. It works out this way because, as Confucius observed over 2,500 years ago, equals make the best partners. Unequals, on the other hand, tend to get on each other's nerves. Specifically, when hotshots work closely with ordinary mortals, you're likely to see their impatience run up against mortals' exhaustion, their condescension against their co-workers' resentment.

As Bank of California's Sorken affirms: "The genius' standard of excellence is different from everybody else's. And when a project gets to those critical stages when tension naturally builds, the clash between the gifted and not-so-gifted can really start to get on everybody's nerves. It just doesn't work out." Thus, if your genius really needs company, by far the best way to provide it is to hire other masterminds.

A tiger by the tail

And then there's the whole question of supervision. Do you need to be a technical hotshot to manage one? Not necessarily, say those who have done it. What certainly is needed, though, is enough managerial experience and self-confidence to be able to keep your authority intact.

"Never let your geniuses engage you in a discussion that you can't understand," warns Geno Tolari, vice president at Informatics General Corp., Palo Alto, CA. His warning underscores the point that, if you're not careful, the brilliance that can work for you can work against you as well. Allowing a subordinate's mastery of technical particulars to confuse and undermine your sense of purpose is one clear example of this.

To be sure, they can be an intimidating lot, these wizards with strange looks in their eyes, who, given the slightest provocation, will start chanting unintelligible computerese. And it's certainly understandable that managers confronting such powerful magic day in and day out could be prone to miscalculation, and under- or overreaction. Either way, the consequences can be most unfor-

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Prima Donnas

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fortunate. In the former case, there is the prospect of seeing a total breakdown of authority—the prima donnas running amok. In the latter, there is the danger that the bosses themselves will fall into a knee-jerk mentality; fighting battles that need not be fought, and eventually—for the wrong reasons—driving the gifted away altogether.

The tension often comes to a head when those with exceptional abilities start to demand extraordinary privileges including, but not limited to, inflated salaries. There are demands made for plush offices, new equipment, flexible hours, trips to esoteric, if not remote, seminars, and work-at-home privileges. The prima donna may actually be worth it all. But there's more involved here than just

Allowing a hotshot's technical prowess to undermine you is an example of brilliance working against you.

the value of one individual. There's the integrity of carefully laid corporate policies to consider. How can any rule continue to be respected if visible exceptions are made?

William Harrison, the dp director at The Hartford (CT) Insurance Co., is inclined to take a tough stand on this issue. "It's wrong to tailor policies to specific individuals," he declares. "It's just too disruptive, and I can't ever remember doing it."

Managers like Chuck Oldenburg, however, are of a different mind. "We have set pay scales and job descriptions around here," says the general manager of computer services at Standard Oil of California, San Francisco. "But where do you find a job description for a genius? I can't give away cars, limousines, or golf-club memberships. So what I try to do is satisfy their special requests."

Sometimes, Oldenburg admits, that does mean breaking the rules. For example, there is one brilliant de-

signer of programmer-productivity tools at Chevron who has a private office. At his level, he's not supposed to have a private office, but he demanded one, and because he was so good and saved the company so much money, he got it. A similarly gifted hotshot comes to work only four days a week. Again, it's against the rules, but working at his terminal at home, he actually puts in the equivalent of a seven-day work week.

Oldenburg acknowledges that management was fearful that such special treatment would stir up resentment among the rest of the staff. "When we allowed this guy to come in four days a week," he says, "we feared the worst: that his colleagues would be lining up at my door. But it didn't happen. People recognized that he was a genius and that he got twice as much work done as anybody else." In all, Oldenburg counts about a dozen among his 1,200-person staff who are gifted enough to be eligible for such privileges.

But perhaps the most precious corporate asset the prima donna puts a claim on is the manager's time. Remembering one particularly talented and troublesome subordinate, Robert Umbaugh, vice president at Southern California Edison Co., Rosemead, CA, says: "I spent half my time managing data processing, and half my time managing him." Umbaugh includes in that estimate all the time it took to counsel the star, chastise him, and smooth the feathers he continually ruffled. For Umbaugh, this went on for several years. The prima donna finally resigned after he was not chosen to fill a managerial position.

Looking back on it now, Umbaugh wonders whether it was all worth it. "You have to do a sort of cost-benefit analysis," he says. "If you have someone who's doing the work of eight people, but burns nine others to the point where they can't do their work anymore, then you'd have to say that person isn't worth it."

But, was Umbaugh's departed star worth it? Umbaugh ponders the question. "I think he was truly indis-



pensable," Umbaugh says. "He had a more thorough knowledge of computers than anyone I've ever known. But I have to say that when he finally left, the department was better off in the long run. The disruptive element was removed and the vacuum in expertise was eventually filled."

Another executive at a west-coast bank is more blunt. Still burning with the memory of a certain prima donna who abandoned him at a project's most critical moment, he decries: "Prima donnas keep reinforcing this perception that they're indispensable. But when you come right down to it, they're like a cancer. Their obnoxious attitude contaminates your whole team!"

And yet, despite everything—their mischief, their orneriness, their lack of loyalty—despite it all, it still isn't easy to dismiss the contributions some prima donnas make. Chevron's Oldenburg certainly can't. He cites the recent case of some homegrown software-development tools that the company wanted converted to a different operating system. Effecting this conversion would enable Chevron to take advantage of a greater number of networking opportunities. Chevron took the problem to IBM, which, after a lengthy study, concluded that 12 workers would need a year to do the work. Instead, Oldenburg turned to four of his hotshots, and within six months, the conversion was completed. "They thought of ways to speed the process that the IBM people hadn't even anticipated," Oldenburg says.

Like drilling for oil in a mine field, soliciting the services of a prima donna can as easily end with a disaster as with a payoff. But when you hear stories like the one that Oldenburg tells—and there appear to be

lots of others—even cautious executives are obliged to take note and ponder the prospects for bringing such brilliance under control for constructive use.

Because prima donnas are easily bored, in high demand, and notoriously independent, the relationship between them and those they supposedly serve is bound to be an uneasy one, even under the best conditions. There are aspects of the prima donna's personality, however, that managers can take heart about, like the overwhelming need to know, solve, get things done, and, just as significantly, the need for constant praise and recognition. For, unlike the average employee with an ordinary range of outside interests, prima donnas are the sort of people who tend to keep all their eggs in one basket.

Being as good as they are, their self-esteem, sense of purpose, and joie de vivre are all wrapped up in their jobs; this puts a tremendous amount of pressure on that job to deliver satisfaction. Managers can't change that situation, but they can defuse it with as simple a gesture as a pat on the back, a trophy, or—as in the case of one manager—a monogrammed necktie.

"I think it meant more to him than if I gave him a \$1,000 bonus," says a midwest MIS manager who recently rewarded one of his top performers with a \$12 red tie emblazoned with the corporate initials. What this fellow had done was invent a programming tool to aid online system development that's so good, IBM has decided to market the product (with, of course, the appropriate royalties reverting to the company).

"I have to tell you that I like them," says Anne Ashley, manager of the Performance Evaluation Center at Amdahl Corp., Sunnyvale, CA. On several occasions, Ashley has successfully utilized the talent of reputed geniuses with whom other managers couldn't get anywhere. "What I have found is that you have to take the time to know them a little bit. You have to coach them, listen to them, get to

know them as individuals. If you give them the feedback they need and the recognition they deserve, they can be real pussycats."

Of course, not all troublesome geniuses can be made to purr, and there may well come a time when

good sense compels you to kick out the most irascible of the litter. "I don't do any complex cost-benefit analyses," says the president of a midwest computer-services company. "My stomach tells me when I've had enough." □

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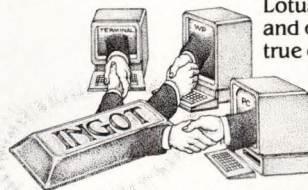
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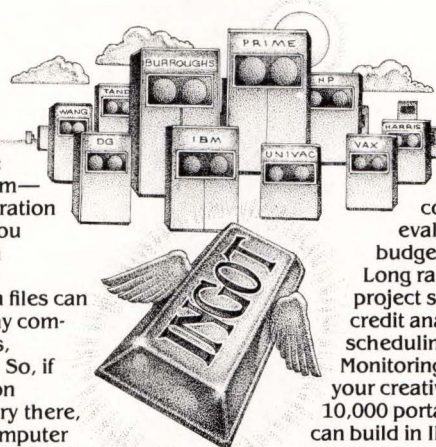


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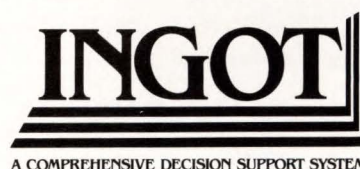
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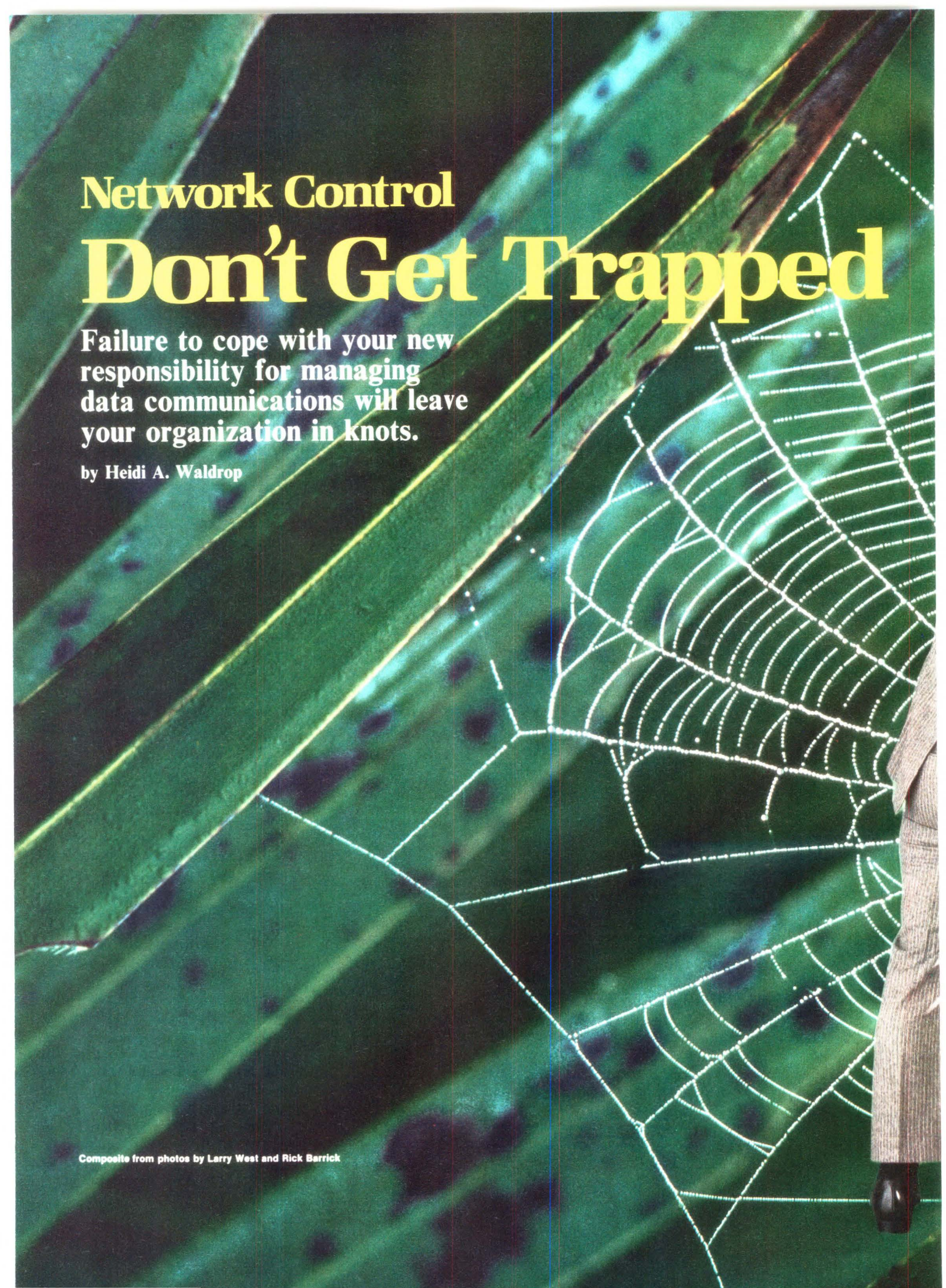
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The background of the entire page is a composite image. It features a large green leaf with prominent veins. Overlaid on the leaf is a white spider web. On the right side of the image, a person's leg wearing a light-colored suit pant and a dark shoe is visible, partially cut off by the edge of the frame.

Network Control Don't Get Trapped

Failure to cope with your new responsibility for managing data communications will leave your organization in knots.

by Heidi A. Waldrop

Composite from photos by Larry West and Rick Berrick

A man in a grey suit is shown from the side, climbing a large, glowing web structure. The web is made of white lines and is set against a green background with blue light streaks. The man is holding onto the web with both hands and is looking up at it. The title "In Your Own Web" is written in large, bold, yellow letters across the top of the image.

In Your Own Web

If you've been getting snarled in your communications network since AT&T broke up, you're not alone.

Horror stories abound. Major complaints include six-month delays on circuit orders, rising local-loop costs, and having to make 15 calls before finding a specialist to fix a problem that's costing \$30,000 a minute in lost business.

The AT&T divestiture meant many things to corporations—frustration, delays, added costs.

More important, divestiture transferred responsibilities from a pervasive, experienced organization to its customers. Suddenly, users have to deal with many vendors and issues they previously left to Ma Bell. "Frankly, the common carriers are in a mess," says Ted McMillan, a consultant

and course director for network design at the Center for Advanced Professional Education, Santa Ana, CA. Many of

McMillan's students are baffled. "Corporations can't take the easy way out anymore," he says. "They're scrambling to understand data communications and network management—and to acquire network-management tools."

The warning signs were apparent for years, but the reality of network management was lost on many corporations. They made do, and continued to rely on AT&T. McDonnell Douglas Automation Co., the St. Louis-based purveyor of computer services, was like many corporations, says James R.

Anderson, senior specialist in network-communications software.

Network Control

(Continued from page 131)

Like other users, McAuto built its network by adding piecemeal communications hardware and playing an unending game of catch-up. "As the network grew larger, so did the need for network management," he says. Anderson wishes his organization realized the importance of network control five years earlier than it did.

Coping with a bewildering array of products, functions, and services is a reality that has been forced on many corporations that formerly handled problems with a single call to their AT&T national-accounts manager. The new AT&T promises end-to-end service, but as a primary customer reselling services to organizations, the giant has lost some of its former clout. Says Chicago-based consultant Gabe Kasperek: "AT&T would like to think it can call the shots, but it can't anymore. The only alternative is for companies to put the pieces together themselves."

Visa USA Inc., the big credit-card operation based in San Francisco, is typical of the organizations that installed their own network-control systems as a defensive measure. "The pressure is on us to identify network problems and know which vendors to contact to fix them," says Ron Davis, senior analyst of Visa's telecommuni-



T-bar's Virtual Matrix Switch allows an operator to monitor and test communications lines in both directions from a central location.

cations network.

Visa joined with Atlantic Research Inc. to develop a network-management system for its two data centers housing five IBM 3083 mainframes serving 15,000 member banks. Visa had to be able to identify problems quickly. It also needed a performance analyzer that could diagnose troubles



Walter Abegnale (right), network coordinator for Home Insurance Co. (New York) reviews network-performance data on a Net/Alert system with Morgan Lamarche, senior vice president of Avant Garde Computing.

at the member banks. Backup was another vital issue: Visa needed a system that held switches in position when a terminal or line failed. "Because of the high level of availability and reliability we require, we had to have backup that would respond without interrupting service," says Davis. "We also had to be able to switch to remote sites without having a technician on hand."

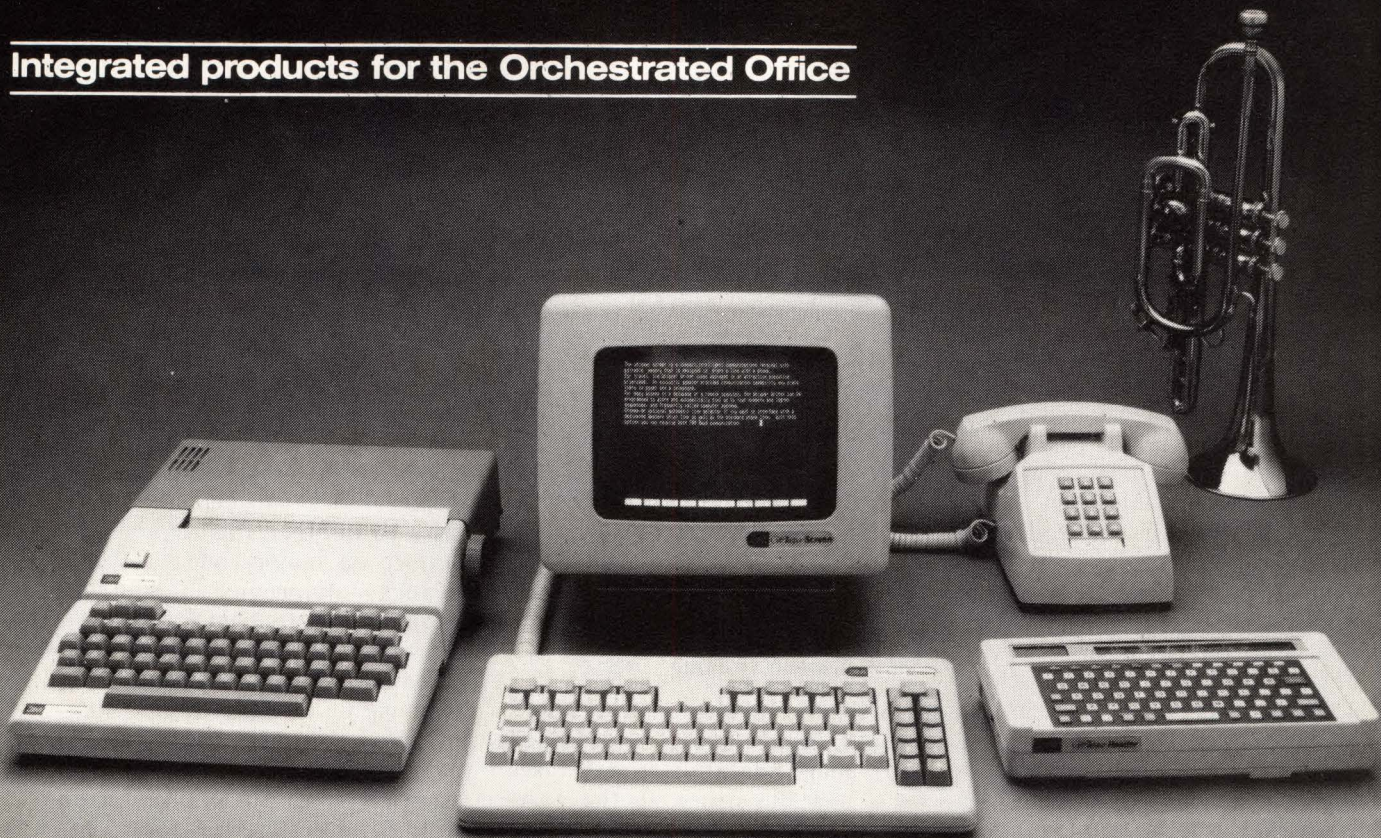
Visa installed Atlantic Research's RCS 100 remote switches and Network Test and Management System at a cost of about \$100 per member bank. Davis believes the cost is more than justified by the network security the system provides.

Before Visa went online with the system, the first indication of a faulty line would come from an irate customer. The operations staff could only respond by saying it would check on the problem. Says Davis: "Now we see the problem first and call the member bank to say we've gone into backup. We'll let them know when we go back to primary service, usually without interrupting network operations."

Line switches can be accomplished without going through complicated routines. Rather than punching in a preset numeric code, technicians plug into simple backup procedures that let Davis' staff switch traffic between groups of lines. Each line in a group is identified, usually by a four-digit number assigned to the originating bank. Lines can be tested at any time. "It's all done remotely, so nobody has to get out and patch lines," says Davis.

If member banks still complain about performance, the system provides Davis with an explanation. "When a bank complains that we aren't available and transactions are backing up, I can set up a tracking routine and explain what happened to them," he says. For example, Visa's network may be available, but an individual bank's communications gear may fail. Giving network members facts and figures helps them understand Visa's position better.

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Network Control

(Continued from page 132)

arises, you may find yourself able to do little else but round up the usual suspects and reach no conclusions. As many as six vendors may be responsible for a single link. Finding out who's at fault is a cloak-and-dagger game. "The number of possibilities for failure is often mind-boggling," says Dixon Doll of the Ann Arbor, MI-based DMW Group. "You've got the interconnect vendors, the data-communications vendors, and your own responsibility for wiring and cabling inside the building."

For some corporations, such as McDonnell Douglas Automation Co., the problem has become critical. "The vendors involved sometimes blame one another," says James Anderson. "It's very difficult to get good turnaround and response on communications trouble calls."

McAuto faces a bigger challenge than many. It has 12,000 terminals linked to seven IBM 3081 and 3083 mainframes in St. Louis and Long Beach, CA. When the Bell System splintered, McAuto decided to seize the initiative and assert control over its own network. McAuto is installing its own high-speed digital links to bypass the common carriers. "We can reduce the number of carriers involved from three or four to one," Anderson says. "That makes it easier to solve problems." McAuto's new system, which relies on IBM's Network Communications Control



Facility and Network Logical Data Manager for automated control and problem diagnosis, will go online later this year.

Vital element: training

A significant portion of McAuto's network-control budget is dedicated to training. Education of staff takes on a new dimension in the post-divestiture era. "Even with all the available tools, the best resource is still a well-trained crew of pros who can identify and handle problems," says Anderson. Effective procedures are important as well.

Recruiting a cadre to manage your network isn't easy. There's a shortage of qualified technicians and managers, and you'll have to either step up in-house training or seek help from outside consultants. Robert Spanvill, president of Delphi Research Group, a New York consulting group, warns that the shortage will grow more severe during the next decade. "Organizations are going to have to use consultants to take up some of the slack," he says.

Even Citicorp, parent of the nation's largest bank and operator of a huge network, uses consultants. "Rather than bringing in consultants to tell me how to cope, I contract out the tedious tasks," says Malcom Haner, vice president and head of international telecommunications development. The outsiders allow Citicorp's 10 full-time engineers to concentrate on major endeavors. The network, comprising 20,000 terminals serving offices in 92 countries, is organized into seven regional—and responsible—operating centers.

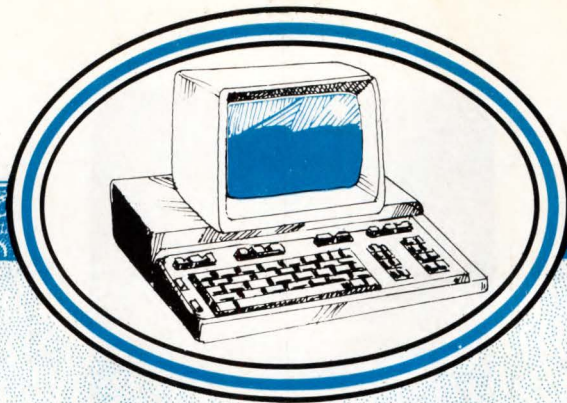
Signing up a strong team is vital, but having the right tools to manage your organization's network is also an essential issue. Some, like Dixon Doll, believe that the tools corporations need just haven't been invented yet. "There's a horrible lack of testing and diagnostic equipment," he says. "We need something that managers can use to examine their PBXs [private branch exchanges], front-end processors, modems, in-house wiring and cabling, local-telephone connections, and long-haul lines to zero in on problems."

Despite his dissatisfaction over the limitations of existing network-control tools, Doll doesn't advise corporations to wait. "It's confusing now, but you've got no choice but to move aggressively," he says. One option is to start from scratch with a new network that builds in management control. Doelz Networks, for example, sells a system it bills as a network-management system that happens to convey data. (See "A built-in cop" accompanying this article.) That approach isn't the norm, however. Analog testers, bit-error-rate testers (Berts), response-time analyzers, data-line monitors, and breakout boxes make up the standard network-control tool kit, and they won't become obsolete soon. In fact, the breakout box will become increasingly important, says Doll. Breakout boxes placed at the connections between the equipment of different vendors will help managers determine who's responsible when something goes wrong.

Software checklist

As the emphasis in network control shifts to software, managers have been given a wider range of choices. Use the following criteria to guide your selection.

- **Versatility:** How easily can you modify a package? Will the vendor supply source code or otherwise help with modifications?
- **Ease of use:** Is the package easy to learn? Does the vendor provide training?
- **Reliability:** Only experienced users can vouch for a package. Ask the vendor for names.
- **Cost-effectiveness:** Make sure your organization gets enough features for its money, but don't waste your time with useless "bells and whistles."
- **Compatibility:** Will the package fit into your setup? Will the vendor help make the fit perfect?
- **Security:** Does the package provide both network and data protection?



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Network Control

(Continued from page 134)

these boxes will have to be compatible with the equipment of many vendors.

The U.S. Marine Corps has adopted Doll's aggressive strategy. The Corps installed a new network two years ago, guessing that the real advances in network control would come in *software*, not new instruments. "There was the question of whether we might be left behind by buying outdated equipment," says Maj. Michael Tallent, network manager. "But we're betting that because diagnostics is based on software, we'll be fine." Within the year, the Corps will be running a network of eight Amdahl and IBM mainframes, 23 NCR Comten front-end processors, and 2,700 terminals in the United States and Japan.

The Marine Corps uses AT&T's Dataphone Digital Service, but Tallent has been examining other options. "Three or four vendors will always be able to meet your specifica-



tions," he says, "and then it comes down to a question of price." The Corps will spend \$18 million over the next five years for multiplexers, modems, digital-service units, network monitors, and the necessary training and maintenance programs.

For many corporations, remote control is the biggest cost-management issue of the post-divestiture era. For example, New York-based retailer J.C. Penney has cut technical-staffing costs and hastened the installation of 700 new lines since it installed Paradyne's 5530 network-analysis system in February. "The

system allows us to centrally maintain modems without having highly qualified technicians out there doing the work," says Roger Williamson, network manager. "What used to take 45 minutes now takes two." Maintenance is handled from a central location; a modem's status can be determined by checking one board.

J.C. Penney previously used Spectron equipment to test lines linking stores. The switch to Paradyne came when the retailer redesigned its network to include a credit-authorization hub for 1,000 Shell Oil gas stations. Next year, the network will be expanded to serve 2,000 J.C. Penney stores and Shell stations.

Bankers Trust New York Corp. made a switch similar to J.C. Penney's last year. Growth of the New York-based bank's network outstripped management's ability to control failures and performance using its old electromechanical system. "We finally went to electronic-matrix switching for monitoring, repair, and more control from a central location," says Frank Paccione, vice president and head of data communications.

Paccione wanted a network-management system in the bank's New York data center, but it had to be independent of the host computers. Bankers Trust has dozens of minicomputers from Digital Equipment Corp., Maynard, MA, and three IBM 3081 mainframes. "It's important to have network management function as a separate policeman," says Paccione. "I'm much more in control—and never at the mercy of a single computer failure."

Paccione tested matrix switches from T-bar and Codex, but had trouble with the Codex system's architecture. "Our lines run at 9,600 bits per second," he explains, "and Codex' equipment distorted communications." Virtual Switch Matrix from T-bar is more successful because it has a more direct path through the modem—one bit in and one bit out, he adds. Bankers Trust also uses its VSMS to monitor and test lines in

A built-in cop

In most cases, network-control capabilities are hooked onto existing networks, like assigning a police officer to straighten out a busy intersection. An alternative is to install a network that integrates management features.

Doelz Networks offers one such network. "As we move data through the network, statistics move along with them," says Jim Mongiello, vice president of marketing. Doelz' network is designed like a racetrack, with nodes at selected points around the track. When a failure occurs between nodes, the network switches to a standby line. If data can't get through the designated path, the network turns them around, pushing the data in the opposite direction in search of a clear path. "The network continuously monitors itself, right down to the physical position of every circuit board," says Frank Connors, president.

The Doelz network is being

tested by the Clark County, NV, library system on a hodgepodge of 48 terminals, including optical-character-reading equipment, touch-sensitive terminals, and an IBM Personal Computer. The library system formerly had a network arranged in a star. "We were paying for far more telephone lines than we needed," says Nancy Hudson, assistant director. "The Doelz network lets you drop data off or pick them up without interfering with either the speed or the integrity of the data. It costs less and allows the equipment to run faster."

Other vendors, including Tymnet Corp. (San Jose, CA) and GTE Telenet Communications Corp. (Vienna, VA), have applied the same principle to conventional packet-switching networks. Software continuously monitors network performance; when a link fails, communications are automatically rerouted.

(Continued on page 140)

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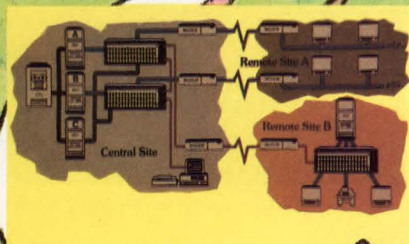
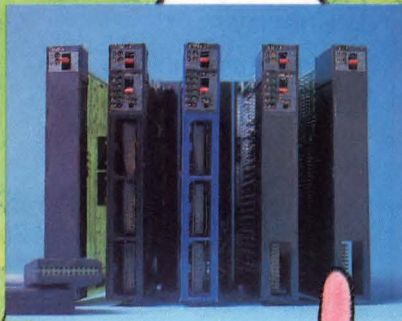
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Immediate display of network alarms	Yes	No	No
Intelligent line data display	Yes	No	No
User-programmable automatic alarms trap	Yes	No	No
Protocol discrepancy alarms	Yes	No	No
Line utilization analysis	12 real time and 30 databased components	3 real time components	2 real time components
Network configuration recognition	Automatically generated and verified	Manual entry required	Manual entry required
Entire database available to host	Yes	No	No
Local (non-host) database	Yes	Yes	Yes
Low maintenance design	Yes	No	No
Special A.C. power	None required	Required	None Required

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Network Control

(Continued from page 136)

both directions from the central-management location. The system allows technicians to switch up to 60 terminals to different lines during a failure. Installing the VSMs cost \$1.1 million.

Until recently, most of the emphasis in network control has been on quick problem-solving. However, as networks become more complex, the emphasis is shifting toward software that can spot dangerous trends and potential trouble spots. These tools transform the role of network managers; they become troubleshooters trying to anticipate problems rather than firefighters trying to end crises. That's closer to Dixon Doll's ideal network-control scheme. "Most of the advances during the past two years have been in software," says Robert Spanvill. "That's where corporations will find solutions to their control problems."

Corporations moving to take advantage of new software tools are setting up databases of network-performance information. With no additional hardware, a manager can use software to probe performance data for signs of impending problems. Chase Manhattan Bank, New York, is one such corporation. Three years ago, Chase installed Avant Garde Computing's Net/Alert system specifically to generate reports on the performance of its securities network. The system records statistics on re-

Ma Bell imitators

For some corporations, third-party service is the most economical network-control alternative. They hire vendors like RCA Cylix Communications, instead of the new AT&T, to take care of service end to end.

United Van Lines Inc., Fenton, MO, rejected installing its own system because of the high cost of dedicated communications lines. The corporation has a network of 250 terminals in offices serving 600 agents. "We may have an agent in Seattle who wants to use the network, but the cost of putting in one line just for that agent isn't justifiable," says Elinor Sirota, director of agency information services. RCA Cylix offers end-to-end service, says Sirota, and that's a lot less expensive than installing dedicated lines and hiring a network-control staff.

sponse time, number of transactions, and applications usage.

One of Net/Alert's first contributions to network control was a report that zeroed in on the cause of a dispute between two departments. The

system determined that an annoying response delay was caused by two factors, the host computer and the network itself. "The delay had been the subject of an ongoing argument between the applications pros and the office manager," recalls Robert Sutherland, division executive for network-support services. "Now the situation is clear-cut. The report comes out in black and white and shows usage all the way down to the individual terminals."

Net/Alert also provides fast reports comparing the status of a particular line at the moment and its status exactly one year before. It can provide reports comparing usage on different dates at the same hour of the day, and also provides readouts describing how each line is being used, breaking down usage by application.

Network-performance reports also help to improve service to users. Reports help to eliminate complaining and bickering about service levels by laying the problems out for all to see. "Terminal-response time is an incredibly emotional issue," says Doll. "One day, users think three-second responses are wonderful, but the next, they'll want faster responses. Reports allow managers to inform users about network conditions that can influence response time."

Some systems let managers broadcast network-performance bulletins to users. Getting the word out completes the task of performance-analysis packages, says Ian Roberts, communications programmer at the State Electricity Commission of Victoria, Australia. The commission, a quasi-public power agency, uses Net/Master from Cincom Systems to monitor a network of several hundred terminals. "Because Net/Master controls all our terminals, we can transmit messages," says Roberts. "The system lets us tell users what is happening and why." For example, a message might go out notifying users that the Customer Information Control System (from IBM) has been disabled. Users would

(Continued on page 144)



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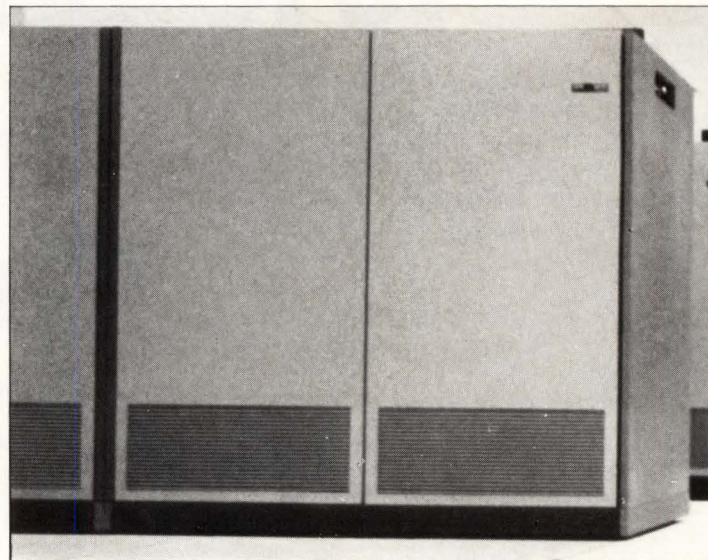
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Photo courtesy of McDonnell Douglas Corp.

Network Control

(Continued from page 140)

rather be notified about such problems than make repeated unsuccessful attempts to gain access to the system only to discover the system is down.

Expanding definition

As corporations gain more experience with their new network-management responsibilities, the definition of *network control* has begun to expand. Some organizations, for example, are integrating network-planning software into their network-control systems. "Following divestiture, the lead time for additional lines has become so long that you have to be able to predict [network] loads," says Scott Hellrung, communications analyst for Citicorp's Person to Person Division. To plan ahead, the division uses Connections Telecommunications' Multipoint Network Design System, a \$3,500 modeling package for IBM Personal Computer.

The package's first task was planning an expansion of the division's network of two IBM 3083s serving 110 offices, each with two to 40 terminals. The expansion will begin next year. "It's a lot easier to justify the cost of a network when you have something on paper to show what the effects might be if you try to take a cheaper route," says Hellrung.

Citicorp's experience is one indication of the role personal computers can play in network management.



Many network managers are already using micros for modeling, but some new software promises to turn micros into network-control stations. Raymond Mazurek, vice president of technical marketing for T-bar, believes micro packages will become increasingly important to managers for whom personal computers are an essential tool. "These packages aren't particularly dramatic, in terms of added capabilities," he says. "But they do provide users with a familiar interface, and that's important."

Integrated security

Security is the other new component in network control. As personal computers spread throughout corporate offices, executives are growing anxious about the easy availability of data to users. Episodes of home-computer hackers breaking into sensitive corporate, government, and medical databases have fed these

worries, says John W. King, a Carmel, CA-based consultant.

Corporations are responding by making security a part of network management. Shearson/American Express, the New York-based brokerage arm of the financial-services giant, is beta testing a new product designed to secure dialup lines. Previously, says John O'Connors, vice president of dp operations, no product provided dialup control and protection. Net/Guard from Avant Garde Computing is being put to the test on Shearson/American Express' network of 11,000 terminals worldwide.

Net/Guard employs a database that stores information on users and usage. The system keeps track of who logs onto each terminal, how long they work, and so on. The system also acts as a protective shell around Shearson/American Express' files and systems. Says O'Connors, "If someone tries to crack the system, they're actually trying to crack Net/Guard, not our production systems. They get bounced before they can get to the host computer."

Encryption is another technique experts believe will become a vital security provision for many corporations. However, for the moment, encryption is a bit pricey, says O'Connors. It's not worth the cost, which is double that of modems. Consultant John King believes that even highly touted encryption chips, such as those made by Motorola and IBM, aren't perfected yet. A more important "technique" for managers today has nothing to do with hardware or software, says King. "Security is a management problem," he says, "and there are no easy technical solutions to management problems. You've got to make rules and enforce them."

Your corporation's network is your responsibility. You'll avoid snarls by assembling the right tools and using them to keep the organization and the network in tune. □

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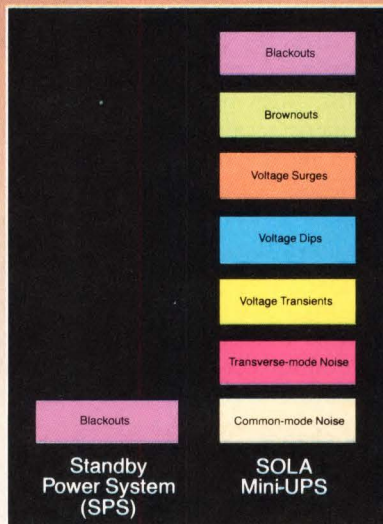
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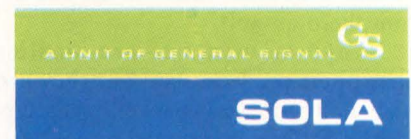
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Environmental control, Part I

Creating a healthy climate for your systems

As dependence on your data center increases, it pays to coddle your expensive charges. When it comes to their surroundings, computers are finicky critters.

By Jennifer E. Beaver, Southwestern Editor

Computers thrive in clean, cool air with a precise humidity level—and they'll make life miserable for you and your business if they don't get it. Although the need for a special computer-room environment is nothing new, its importance has increased with the growth of information processing as a critical business tool.

"Computers, like people, function best in the proper environment," says Haus Levy, president of Edpac (formerly AC Manufacturing), a maker of computer-room air conditioners. Head crashes, temporary or permanent chip failure, condensation or corrosion within equipment, and printed-circuit-board failure are just a few ways computers and peripherals can express displeasure when the atmosphere fails to meet certain standards.

Equipment costs are reason enough for vigilance. A typical 40-foot-by-50-foot data center contains an average of \$4 million worth of hardware and software. Damage to these resources, whether through long-term negligence or a sudden blaze, can be devastating. As you add new equipment and expand your data center's size, you must adjust the atmosphere as well.

Newer mainframes are smaller than their predecessors, but they are also more densely packed with circuitry. Studies conducted by Liebert, a major air-conditioning manufacturer, indicate that the most

recent models run well at slightly higher temperatures, but they are less tolerant of wide temperature swings.

"Newer mainframes require sophisticated air conditioning," says Graham Whitmore, vice president of Hiross, an air-conditioning manufacturer. "The electrical output is still directly converted into heat, which must be removed."

Still, tales persist of mainframes and peripherals that work happily, day in and day out, while hidden away in closets. "Don't believe it," says Edpac's Levy. "Computer vendors play down the effects of environment on their equipment. To make a sale, they say, 'With my equipment, you don't have to do anything.' But there is a definite correlation between temperature and frequency of repair."

Cool change

Larger mainframes still require chilled water systems to cool their densely packed circuitry. These systems pipe cooled tap water around the heat-producing elements in computers. A denser and more efficient heat absorber than air, the cool water provides the best internal operating atmosphere.

Heat produced by central processing units (CPUs) isn't the only factor that affects cooling requirements. In Arlington, VA, Capital Systems, a builder of government data centers, needs to add 40 tons of air-conditioning capacity to its facili-



Photo by Horticultural Society of New York



Environmental Control, Part I

(Continued from page 147)

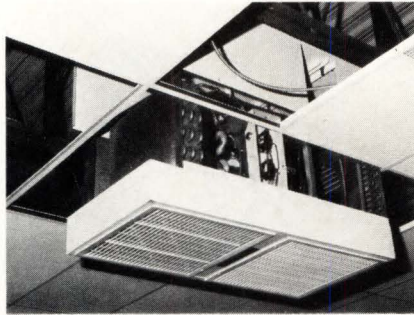
ty due to a 4,000 square foot expansion and the addition of several heat-producing IBM 3350 disk drives.

Before shopping for an air-conditioning vendor, facilities manager Pat Aman drew up a checklist of required features. Her must-haves include redundancy (no single point of failure), reliability, ease of maintenance (can Capital personnel change the filters?), and ease of expansion.

It's not a task Aman takes lightly. "Choosing environmental equipment is as important as selecting computers," she says.

If you've added a few terminals or personal computers to your data center, they too can alter your cooling requirements. "Terminals are like light bulbs," explains Art Bechnke, director of Edpac's Washington office. "If you add one 100-watt bulb, you don't feel any hotter. Add 100 of those bulbs, and you'll notice a difference."

Once you've determined that you need more air conditioning, almost any supplier of processed air can deliver the goods. (Processed air, produced by specially designed units for



This ceiling-mounted air conditioner, the Hilander from Hiross, replaces a standard 4' X 2' ceiling tile. The 1.5-ton unit lowers with the aid of a built-in jack for easy maintenance. Either water- or air-cooled, the unit costs between \$2,000 and \$3,000.

data-processing equipment, maintains more precise temperature and humidity levels than the comfort air used to cool people.) Special features will help you narrow your choices.

Dama Telecommunications Corp.'s new data center in Rockville, MD, isn't very big—only 2,800 square feet. To get the most out of the room she has, Debbie Wessner, director of network operations, chose two redundant 15-ton air conditioners from Airflow over two competitors because the Airflow units can be

placed against the wall. The out-of-the-way units leave more floor space for other equipment. Set on special steel frames to minimize vibration, the units have front panels that allow easy access for maintenance.

A ceiling-mounted air conditioner is another option when space is at a premium. The Hilander by Hiross, for example, fits in the same space as a standard 4-foot-by-2-foot ceiling tile and lowers for easy maintenance. It controls temperature, humidity, and filtration without occupying valuable floor space.

Miserly coolers

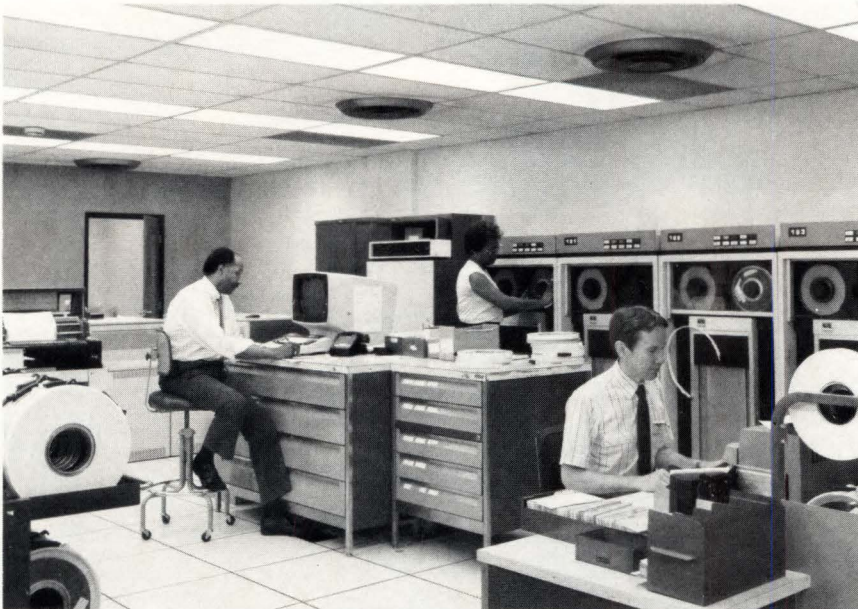
The cost of air conditioning doesn't stop when you pay for the unit. Rising electrical bills have forced dp managers to be particularly cost-conscious.

That's why energy-saving economizer units are gaining popularity. Based on glycol, the same ingredient in car-radiator antifreeze, these systems take advantage of low outside temperatures to draw off heat from roof-mounted condensers. They save money by decreasing reliance on electrical means of heat removal.

Free-Cool, a new line of economizers from Hiross, can reduce energy costs by operating when the outside temperature hits 45 degrees F. Competitors' machines, according to Whitmore, can't be used until it's at least 10 degrees cooler.

Because the units are slightly more expensive than standard glycol systems, most dp managers would want more proof before choosing Free-Cool. Hiross provides a computerized projection of the savings a Free-Cool unit would realize over a 10-year period. The calculations, based on U.S. Armed Forces temperature statistics, assume an 18 percent annual interest rate and a 10 percent annual inflation rate.

Although the Free-Cools are so new that they've yet to weather a winter, some corporations have ordered them based on the savings projected by the Hiross computer. The University of Cincinnati, for example, should save \$1,250 per year in energy costs by using Free-Cool over



Three circular ceiling vents are the only visible signs that the concealed Smokeeater air-cleaning system is hard at work in this Control Data computer room in Cincinnati. Made by United Air Specialists, the Smokeeater units filter out dust and other harmful contaminants that can shorten the life spans of expensive equipment.

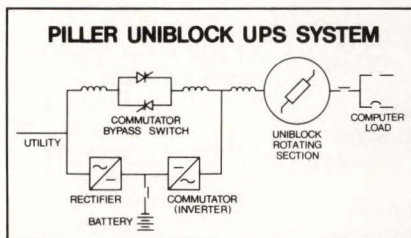
Announcing the most advanced UPS system ever designed!

Even before its formal introduction, the new Piller UNIBLOCK Uninterruptible Power System (UPS) was already being installed at major telephone, television, and telecommunications installations, banks and financial institutions, data services companies, and automated manufacturing installations worldwide!

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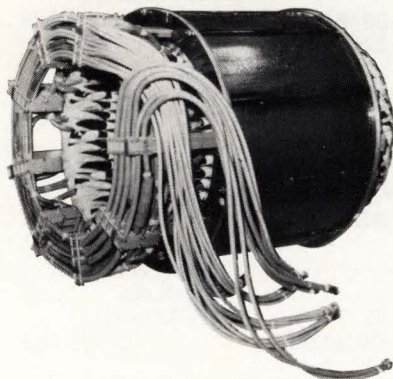
$$1 \text{ STATIC UPS} + 1 \text{ STATIC UPS} = 1 \text{ UNIBLOCK UPS}$$

The Piller UNIBLOCK is the first UPS system that offers dual power paths, each capable of supplying full rated power to the computer. That means built-in redundancy in a single module. (So a single UNIBLOCK UPS System provides the same protection as two static UPS systems!)

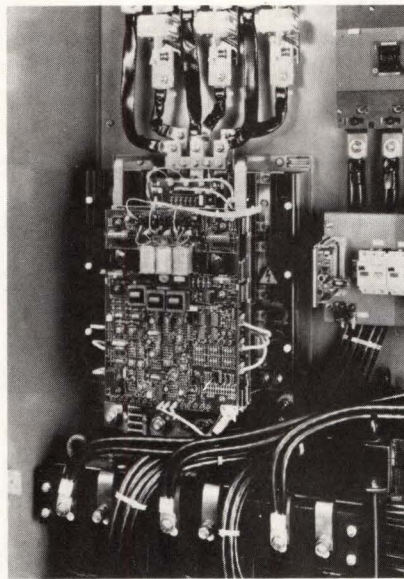


Superior efficiency

It's the first rotary UPS to offer efficiency equal to and even superior to that of static UPS



systems. (No other rotary-based UPS even comes close!) That's the result of the exclusive Piller rotating power conditioner...the first ever to combine primary (motor) and secondary (generator) windings on a single stator with a common rotor.



Superior reliability

It's the only UPS system to offer four times the reliability of a static UPS system. (The UNIBLOCK's simple commutator (inverter) is only a fraction of the size of a static UPS inverter and has only 25% the parts count!)

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It's the only UPS system to offer up to 100ms ridethrough, plus complete isolation of the load from the utility, and protection against, voltage spikes, voltage

sags, brownouts, even without a battery.

The right system for your power requirements

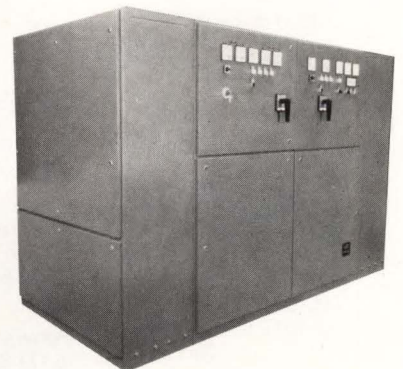
It's the only UPS system available in KVA ratings to cover the entire range of mainframe power requirements from 40 to 500 KVA...plus an off-line battery, constant-voltage battery charger, automatic bypass switching, power distribution system, and diesel-electric emergency power generation capability...all from a single source!

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Environmental Control, Part I

(Continued from page 148)

a 10-year period, according to Whitmore. This would make up the cost difference between Free-Cool and a standard glycol unit in one year.

No matter how carefully you shop for energy- and cost-efficient air conditioning, your operating expenses may be up to 50 percent higher than necessary if you don't enclose your data center with a vapor barrier. Designed to maintain a precise humidity level, coverings such as oil-based paint and vinyl sheeting help conserve energy as well.

Dp staff frequently forget to install vapor barriers, especially on ceilings

and floors, then blame the vendor when condensation causes equipment malfunctions. "They forget because the problem is so intangible," says Whitmore.

Another humidity-spawned villain, static electricity, jolts circuits and may cause computers to develop amnesia and generate erroneous data. In a properly humidified computer room, static shouldn't be a problem. Other areas of your data center—especially those full of terminals and personal computers—might benefit from anti-static devices like sprays and floor and desk mats. Heavily

trafficked areas are particularly susceptible, according to Gary Jones, president of Omnium Corp. (formerly Computerware), a manufacturer of anti-static desk mats. "People are static carriers," he explains. "If a computer is alone in a room, the static won't jump across the room and zap it. But a person can generate 30,000 to 40,000 volts just walking across a carpet, and transfer that charge to the computer."

Clean air can extend the life span of your computers, peripherals, and air-conditioning equipment. The Graphics Communication Depart-

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HOW TO PROTECT YOUR COMPUTER SERVICE FIRM AGAINST THESE TYPICAL SOURCES OF ERROR.

No matter how skilled you or your staff may be, there are still bound to be errors now and then.

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And you or your firm could end up responsible.

For example, what would happen if someone's error causes one of your computers to issue more payroll checks than it should?

Or if a mistake in a computer's accounting program puts a halt to a client's business-as-usual?

You don't need a computer to calculate that the lawsuit costs from errors such as these could be too steep to handle.

And you can't always rely on a "hold harmless agreement" to protect you either, because a court of law can invalidate it and find you liable anyway.

That's why National Union Fire Insurance Co. of Pittsburgh, Pa. is offering Electronic Data Processors Errors & Omissions Insurance. It's designed to protect fee-based computer service firms against financial losses from claims made against them for wrongful acts occurring during the performance of services for others.

One of the most comprehensive EDP E&O policies on the market today. Unlike some EDP E&O policies, ours isn't limited to covering data processing, programming, or software designing. It also covers consulting and providing advice and opinions.

What's more, National Union has been a well-known and respected source for professional liability coverages for nearly two decades now. And that means you can count on our experience and stability to back up every policy we issue.

So remember: as the demand for outside computer services increases, so will the potential risks. Which means there's one error you can't afford to make—leaving yourself or your firm unprotected by National Union's EDP E&O Policy.

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(Policy provisions are only briefly highlighted here. Refer to policy forms for complete details.)

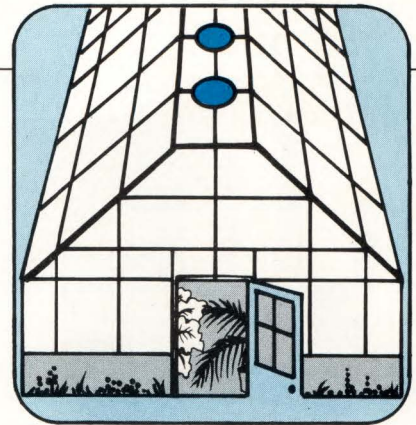
Environmental Control, Part I

(Continued from page 150)

ment computer room at California Polytechnic University, San Luis Obispo, CA, cut its outlay for new filters in half by installing an air-cleaning system.

The 16 disk drives in the room require a clean atmosphere to prevent

equipment damage. Each disk drive has a filter to remove smoke and dust, either of which can damage the program or the head. When that happens, it costs between \$2,000 and \$5,000 to replace the head and disk. Replacing worn filters every six



months costs the University about \$3,000 a year, according to Tom Dresel, equipment technician.

Ten months ago, Dresel installed a 1500SE Smokeeter Electronic Air Cleaner from United Air Specialists. He has yet to change a disk-drive filter. If the Smokeeter (models range from \$400 to \$1,350) reduces filter costs by one-half, as Dresel anticipates, it will have paid for itself in one year.

A clean, comfortable environment for your computers isn't enough—the surroundings must also be as fire-proof as possible. Just as your air-conditioning needs change with your computer-room site, so do your fire-suppression requirements.

"The cost of data loss is so astronomical that a fire-suppression system deserves serious consideration," says Bill Fidelibus, sales manager at San Diego Fire Equipment. The best fire-suppression system for data centers, according to experts, is Halon 1301 gas backed up by water sprinklers. Federal, state, and local governments all have certain standards your system must meet. Your insurance carrier will also have certain specifications, but not all insurers require Halon. Those that don't are primarily concerned with preserving the building (which sprinklers can usually save), rather than with saving your data-processing equipment.

In addition, Halon still suffers from new-product skepticism, says Dick Joy, vice president of Master Protection in Los Angeles. If you rely on water alone to protect your equipment, you're taking a big risk. Sprinklers don't usually kick on until the temperature reaches 165 degrees, and much valuable data can be lost.

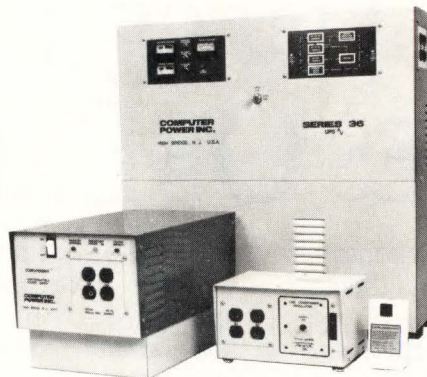
Also, water can set off a chemical reaction that can be very detrimental

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to your equipment. All computer wires are covered with polyvinyl chloride (PVC). Once the covers burn and turn to ash, a liberal dose of water will result in the production of hydrochloric acid, which can destroy the wiring and corrode components inside the computer.

Despite the inadequacy of water alone as a protection system, Halon systems frequently come under attack because they sometimes fail to operate. Master Protection's solution is to hold a test run witnessed by representatives of the local fire department, the insurance carrier, and the facilities manager.

How's the fire protection in the rest of your building? It pays to be nosy. Industrial Risk Insurers of Hartford, CT, recorded the case of a fire that started in a room directly below a data center. When the ceiling collapsed, the mainframe on the floor above went, too.

Certainly you have better things to do than check your environmental controls several times a day. Even the most dedicated dp managers can't spend their whole lives watching over the computer room.

You might entrust the job to a monitor, such as the Computer Room Alert System by Innovations in Control. This system, designed to monitor all aspects of computer-room environment, has been installed in 150 computer rooms.

One such monitor is in the data center of PMI, a mortgage insurer, in San Francisco. When a problem arises and no one is in the data center, the system alerts a local monitoring center via the phone line, much like a burglar alarm in your home will trigger a response from the local police. When a roof condenser at PMI failed, the monitor dutifully notified the monitoring station of the increase in temperature. Unfortunately, no one at the station contacted PMI personnel. The temperature eventually reached 97 degrees. Although there was no permanent damage, the data center had to shut down for 10 hours while the room cooled. Several months later, an air-conditioning

compressor failed. This time, PMI personnel shut down the computer before the rising heat could damage it. PMI then instituted an automatic system shutdown that activates when temperatures reach levels harmful to their equipment.

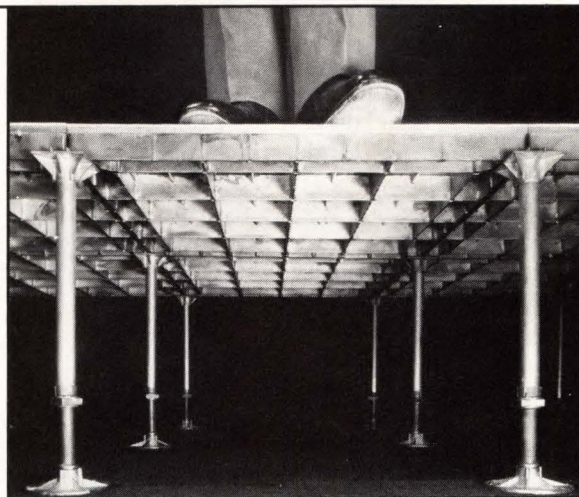
Despite the best precautions, your computer room will have to endure environmental fluctuations. You can help your equipment—and your whole business—weather any changes by being aware of your surroundings. □

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Environmental control, Part II

Tending to your micros

Personal computers, like mainframes, need a healthy operating environment. The fact that micro care is the responsibility of the end user makes it a difficult art to practice.

by David Roman, Staff Writer

Organizations that use mainframes willingly spend thousands of dollars to ensure that their computers are in the proper facilities, under the proper care. Unfortunately, they aren't as generous when it comes to their personal computers. Most micros are placed on desktops with little thought given to their operating environments. And because micros don't require up-front preparation the way a larger system does, proper care can be temporarily or permanently overlooked. "Data processors look with care to their computers," says Daniel Heinchon, a consultant based in Flagstaff, AZ. "But micro users generally aren't dp pros, and the problem is that the micro's operating environment is much harsher than the mainframe's."

"Large mainframes are locked behind closed doors in controlled environments, so even if the office is hot, the computer room stays cool," says William O'Neil, director of microcomputing for First Boston Capital Group, a wholly owned subsidiary of First Boston Corp., the New York investment bank. "That's the proper way to take care of computers. Personal computers should be treated with the same care."

(Continued on page 156)





Environmental Control, Part II

(Continued from page 155)

Large organizations that rely on mainframe systems would seem the most likely candidates to know that personal computers need special care. According to Michael Merritt, the president of Merritt Computer Products in Dallas, a company that makes protective covers for personal computers, large organizations are often extremely negligent of microcomputer care. "Large portions of the big-systems audience shrug their shoulders at the idea of personal-computer care," Merritt says. "They don't think it's important."

An organization that runs its major applications off a mainframe isn't likely to miss one personal computer—whether it's put out of commission through poor care or by some other mishap—at least not as much as a small business whose personal computer is the extent of its data-processing power. A large organization may have spare micros it can shuttle in and out of service as needed. A small company or a branch office of a large company doesn't have that option. "If an office has only one micro, it has to go to manual operation when its computer goes down," says Heinchon. "If the computer takes two or three weeks to get repaired, that office is at a real disadvantage."

Personals aren't important . . . yet

"No one in our organization is using a protection system or protection gear on a personal computer," says Robert Margo, the vice president of data-center operations at McKesson Corp., the San Francisco-based company that ranks ninth on Fortune's list of diversified service companies. "But the data on them are not primary data. They may support the efforts of the individual operator but they don't contribute to the basic operation of the company. Any information that relates to our business is available online from our mainframes."

"I suspect we're not far from the time we'll have communication between personal computers and minis and mainframes. Then we'll want to have some method of protecting all our information, whether with a con-

tinuous power system, or backup security," Margo says. "I just don't think we've reached the stage where our company has considered using these forms of protection."

Margo has worked with mainframes and is aware of the environmental attention large computers need. So it's not ignorance that prevents him from giving McKesson's



"The data on our personal computers are not primary data. They don't contribute to the basic operation of the company." *Margo, McKesson*

micros equal attention. His attitude, which is not uncommon, is that personal computers just don't need care at this time. Many organizations and individuals that use personal computers have been encouraged by product literature and computer publications to adopt protective equipment and safety measures. In spite of this, their computers continue to operate without power protection, or protection from dust or static electricity. Despite oft-repeated reminders and warnings, users still eat snacks, drink coffee or soda, and smoke near their machines. Bad habits are hard to change, and most managers probably don't have the time or facilities to enforce behavioral-modification techniques within their companies.

In a small office or organization, one individual may be the personal computer's manager, user, and care-

taker. Should he or she decide to eat lunch next to an uncovered machine—or fail to make backup disks—or refuse to invest in a surge suppressor—there's no one around to suggest a more positive approach. According to Dan Heinchon, the consultant who has studied personal-computer care, there is only one experience that will change a person with sloppy computer-protection habits into a conscientious user. That experience is encountering disaster.

Learning the hard way

"The quickest way to learn to do something you're not inclined to do is to lose your data," Heinchon says. "Then you'll learn *real* fast." Data are, after all, more vulnerable than a machine, and harder to replace. "A big company can replace a machine easily," says Bill O'Neil. "That's no problem. The problem is the loss of data. If you're using a personal computer as a data-collection device, there's a chance you'll lose all your data if your power goes out. If you don't have all your files and data backed up, it might take you weeks to recreate them all."

In fact, most protective gear available for personal computers is designed to protect software and data. Anti-static mats and sprays shield against the static charges that may zap information off your disk, but pose almost no danger to your hardware. Surge-protection equipment and backup power systems also protect data—and to a lesser extent, hardware—from power irregularities and outages. Storage boxes shelter disks from contact that may destroy or disturb data. A dust cover's main purpose is the protection of hardware.

Hardware prices have to be a consideration when a company or an individual weighs the importance of computer care. A mainframe can cost millions, and that investment must be protected without question. The few thousand dollars invested in a personal computer, however, can be more easily overlooked. "Ten thousand dollars is not a significant amount of money to a Fortune 500 corporation,"

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THE QUESTION ISN'T WHO'S BIGGER.
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Environmental Control, Part II

(Continued from page 156)

says David Johnston, chief executive officer of Safeware, an insurance agency in Columbus, OH, that only sells policies protecting personal computers. "It's cheaper for them to ab-

sorb the loss of one system than pay to insure or protect them all."

Protection equipment can be costly, especially if it's required for every microcomputer in a corporation. But

it doesn't have to be. Consultant Heinrichon says that an uninterruptible power supply (UPS), the single most expensive protection device for a personal computer (ranging in price from

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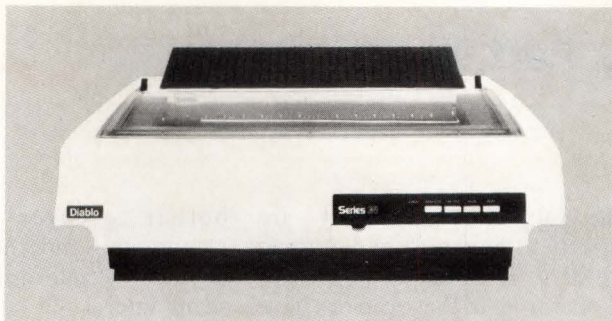
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Environmental Control, Part II

(Continued from page 158)

\$400 to \$800), may not be needed for every micro. "UPSs are more expensive than other protective devices, but their importance depends upon how much you use your computer." This decision must be made by each user, but Bill O'Neil says, "If the information you store on a hard disk is important, then \$400 is not a lot of money."

Other equipment that protects a personal computer or its operating environment is often more reasonably priced than the backup power supplies. While the purchase of a UPS may be optional, some of the other protection products are considered essentials. Their more-affordable price tags make them accessible to any organization concerned about its personal computers.

An organization that runs major applications off a mainframe isn't likely to miss one personal computer.

Surge suppressors, which protect personal computers from sudden electrical surges or glitches that might cause errors or destroy data, are commonly used devices. "Power surges are the biggest threat to a personal computer," says Joe Gledhill, the supervising marketing analyst for Travelers Corp. in Hartford, CT, a carrier that provides personal-computer insurance. "We recommend the use of surge protectors, and look favorably on those who use them." David Johnston, who heads the SafeWare insurance agency, says that the best safety tip he can give microcomputer users is: "Use a surge protector." (See "Shielding Computers From Power Mishaps, Part II: Personal Computers," March.)

Surges are actually variations in the voltage of the electricity that flows through power lines. Lightning can cause brief, severe surges in power that is already uneven. Some areas in the United States—Florida, Arizona,

and the Gulf states top the list—are more likely to be struck by lightning than others. Because of this, businesses operating in these regions have to be particularly careful with their data-processing equipment, whatever its size.

Tom Himes, the vice president of Essex-Himes Leasing in Phoenix, AZ, says, "I've lived in Phoenix long enough to know about the terrific power surges we get whenever there's lightning. We'll have shorts and the lights and phones will go out." Himes' business, which sells and leases cars and business equipment—including computers—has a \$20,000 investment in a computer from Oakleaf Corp. of Chatsworth, CA. The Oakleaf is a multi-user personal computer that's sold to automotive dealerships.

"If I pay \$20,000 for a system, I don't want power surges to mess it up," Himes says. "They could damage our programs." Essex-Himes uses the Oakleaf to keep track of all its customers' names and addresses and to write up contracts for customers. These contracts are the computer's major task. "We're working on them constantly," Himes says. "The computer's on all the time, maybe 12 hours a day, calculating deals. For this reason, we want to protect it." The Oakleaf uses a surge suppressor from Transtector Systems. "We had some pretty good storms, and we know there have been surges," Himes says, "but no damage was ever done to the system. We've spent the \$100, and now we don't have to worry about it."

Much personal-computer care is simple and inexpensive, compared to maintaining a mainframe. Perhaps the simplest, most effective measure is remembering to throw a cover over your micro. "Most equipment breakdowns are caused by dust and dirt," says Maurice Sandel, the vice president of Quality Compu-covers Inc. "Dust builds up in a keyboard or a disk drive, and can cause problems." It's not as essential to cover monitors or terminals says Sandel, because they're not as vulnerable to dust as the disk drives and keyboard.

The fact that so few organizations

bother to cover their personal computers—and that the personal-computer vendors also seem to have scant interest in cover protection—puzzles Sandel. "When everyone was using typewriters, every company—especially IBM—sold covers with typewriters. When these same companies started to sell computers, the covers were eliminated."

The covers sold by Sandel's company can only be used when the computer is not in use. They cannot provide constant protection from potentially damaging particles (or even insects), but they, "keep dust out of the keys and the machine's inner workings," says Dan Heinchon. "Anything you use to keep the computer clean, like dust covers or plastic storage boxes for disks, is going to

"Nobody in our organization is using protection gear on a personal computer."

Margo, McKesson

extend the life of your computer, and reduce your incidence of failure."

While acknowledging the value of dust covers, Michael Merritt of Merritt Computer Products feels the protection they offer is incomplete since they're removed whenever the computer is in action. Merritt's company offers Safe Skins, covers that stay on the keyboard while the computer is in use. "Safe Skin is a precision-molded cover that's very flexible, and almost transparent as it covers the keyboard," Merritt says. "It's like a second skin, protecting against liquid spills, dust, paper clips—anything you might drop into a keyboard." Merritt says the covers are particularly useful for applications where dust and debris abound, such as in a factory.

There are other environmental by-products that can affect your personal computer. "Static is one of the most overlooked protection problems," says

(Continued on page 192)

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Executive's Guide To Printers

The new printers operate faster, print more legibly, and cost less. But with more machines to choose from, you must carefully weigh your options.

by David Whieldon, Senior Editor

Have you been buying printers as if they were just junior-grade accessories to be hung on a system? Have you been buying the cheapest possible machines to meet your specifications?

That technique may have worked well enough in the past. But with advances in printer design and the development of innovative printing methods, you owe it to your organization to make a more educated selection

the next time you're in the market for printers.

Most impact machines—thermal, dot-matrix, daisywheel, band, chain—and their nonimpact counterparts—laser, ion-deposition, ink-jet—are used for familiar applications. But familiarity should not breed contentment. You may not be getting the most for your money if you're overlooking valuable new features and methods that could make a big difference in your operations. Before you set out to buy new printers, be aware of the latest trends:

- Machines at the low end of the price scale are getting cheaper. Many small dot-matrix or daisywheel printers may be preferable to one large,

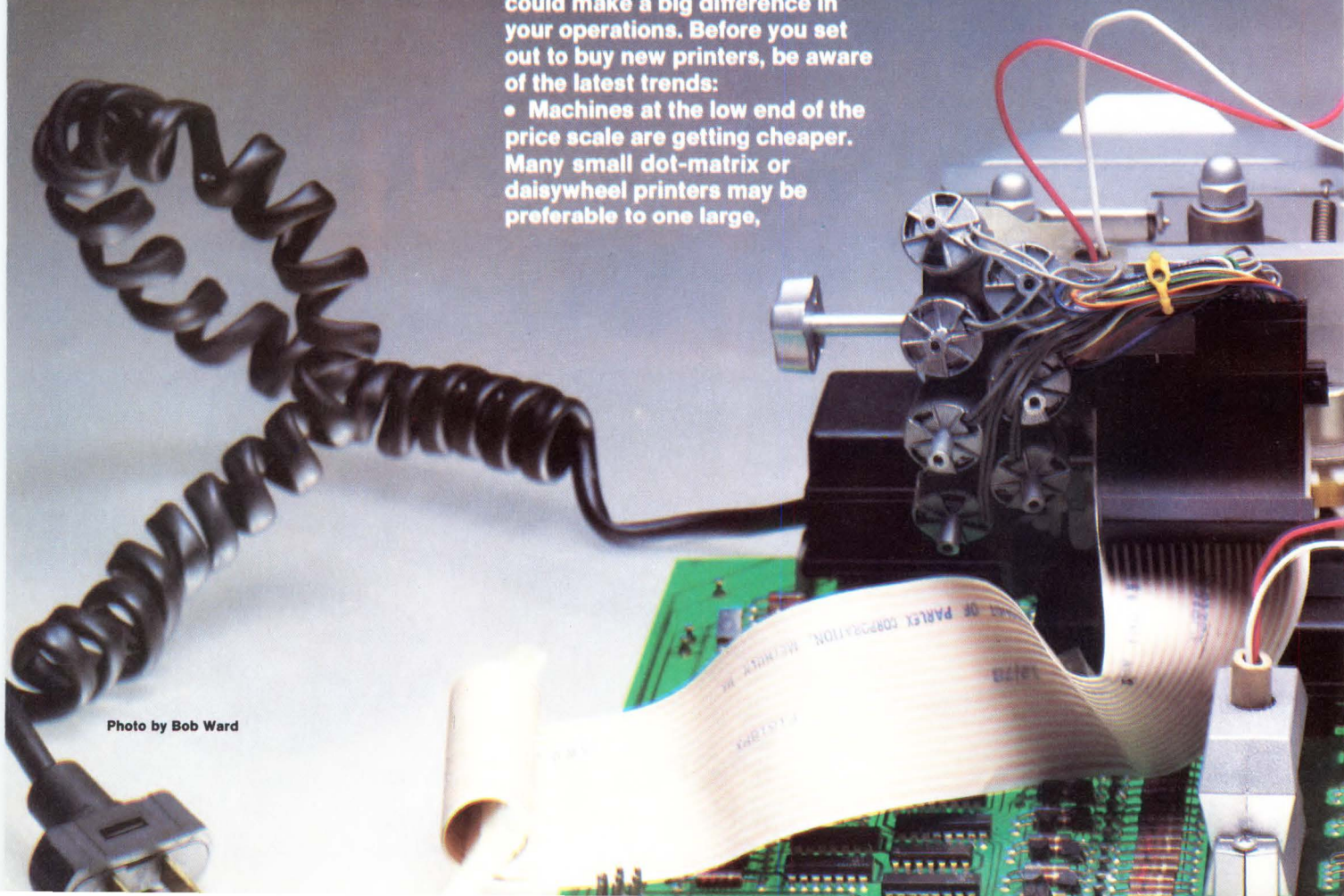
expensive printer to serve several personal-computer users.

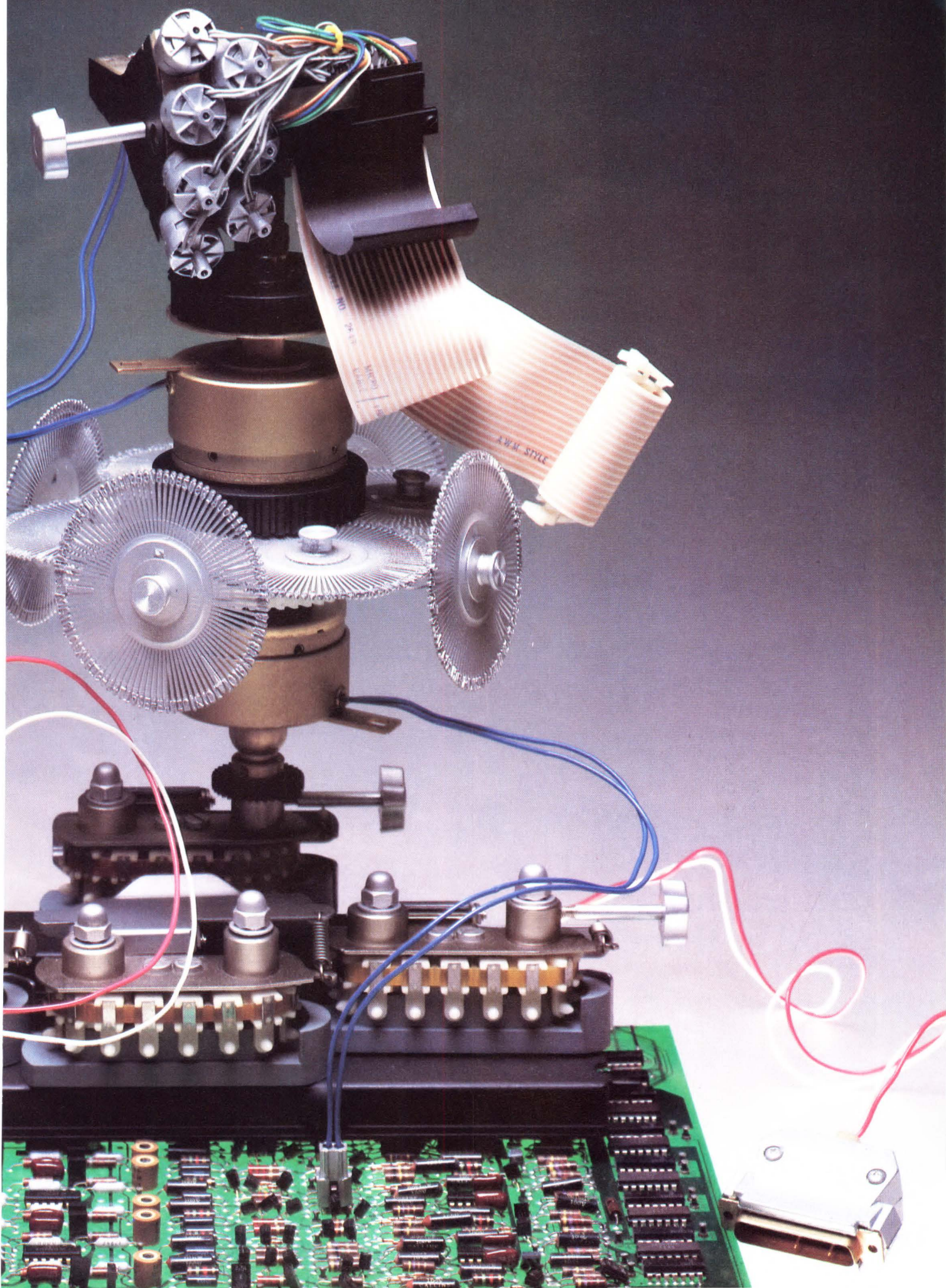
- Laser page printers of various sizes can do many tricks—provide higher resolution, manipulate text and graphics, operate faster than before, print on both sides of the paper.

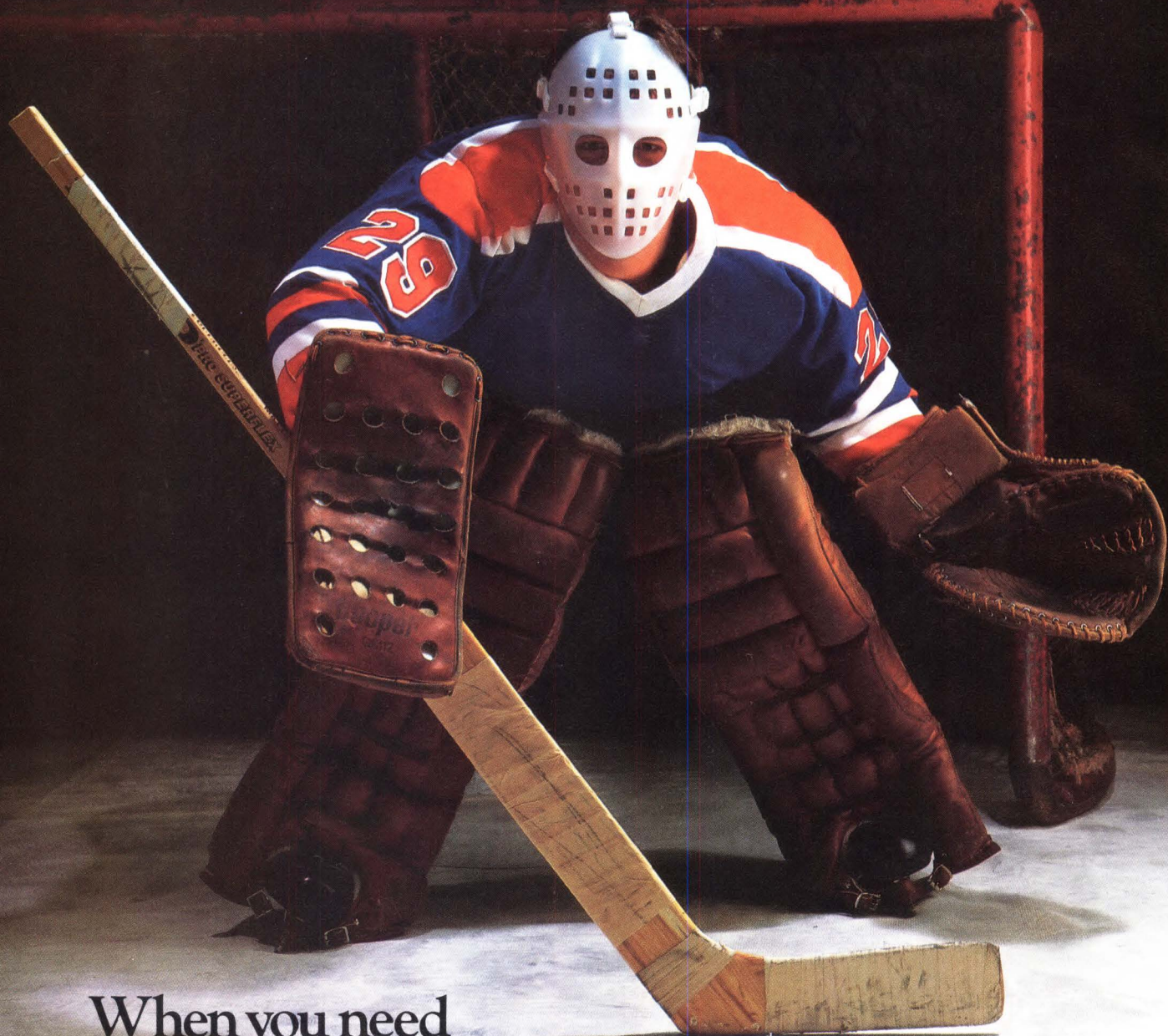
- Reproducing color graphics is becoming cheaper and easier. If you're buying dot-matrix machines, you might want to

(continued on page 165)

Photo by Bob Ward







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Guide to Printers

(Continued from page 163)

spend a little more to produce business graphics in color. Or you might consider ink-jet printers.

- Printer versatility and print legibility continue to improve. Some dot-matrix manufacturers are getting closer to letter-quality printing—and they can shift to high-speed, draft-quality work as needed.

An enlightening subject

Much excitement has been generated by nonimpact machines. These quieter machines are now appearing in data centers and offices—and they carry price tags with four digits instead of five or six.

"Developments in electrophotographic technologies—with imaging by lasers, light-emitting diodes (LEDs), and modulated conventional light sources—have been moving at an extremely rapid pace," says Barry Harris, a vice president at Dunn Technology Inc., Vista, CA, a market-research company. Such machines, continues Harris, "bring capabilities to the end user that haven't been there before due to output-device limitations."

Although his company is known for its larger laser machines, Webb Castor, senior vice president of the Systems Marketing Division at Xerox Corp. in Stamford, CT, says, "The real explosion is taking place in low-cost nonimpact machines."

Edward Webster, editor of the newsletter *Printout*, agrees that there's much interest in low-end page printers. "Although laser printers won't take over the world," he reports from Newtonville, MA, "we're convinced that they're here to stay. At about \$1,000, Canon's new LBP-CX is a breakthrough printer," he says. "Hewlett-Packard and Imagen have come out with versions of it, and Apple may follow soon."

There are important characteristics that differentiate the Canon laser printer from its competitors, according to Harris. "Instead of reacting to an inserted document, the LBP-CX is driven by a data stream similar to the one accompanying a computer-line or daisywheel printer," he explains. "The



LBP-CX produces roughly eight pages per minute; a daisywheel can print only about one page per minute."

Hewlett-Packard (Palo Alto, CA) boasts that its printer, the Laserjet, is fast, quiet, low-priced—and connects to HP personal computers, IBM Personal Computers, and IBM PC-compatibles. Four plug-in cartridges, in addition to a standard font, permit font changes on the same page. The Laserjet costs \$3,500 and takes up about the same amount of desk space as a personal computer with keyboard.

The Imagen 8/300 from Imagen Corp. (Mountain View, CA) resembles Hewlett-Packard's Laserjet.

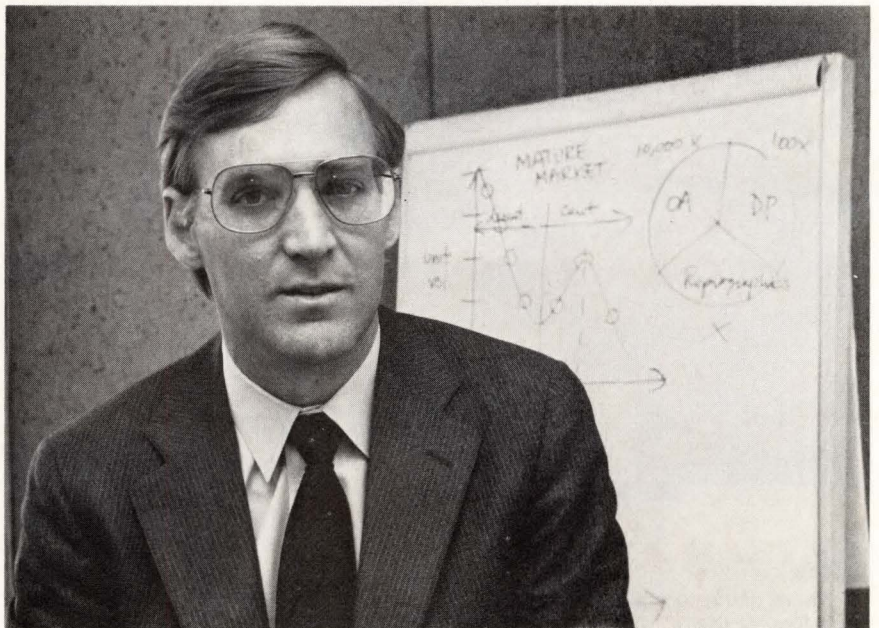
It operates at the same speed and resolution, and is also housed in a desk-top enclosure. The Imagen 8/300 costs \$9,950, including interfacing, font-choice, and image-processing features.

Then there's the Lasergrafix 800, from Quality Micro Systems (QMS), Mobile, AL. The printer comes in three different models, ranging in cost from \$3,000 to \$10,000. The models vary in the number of fonts available—four to 26. A controller provides full bit-mapping on images of up to 8½-by-14. Like Imagen, QMS markets larger, more sophisticated machines at higher prices. According to Robert Wallace, president of Imagen, the small laser printers can benefit "users stuck in the middle between daisywheels and typesetters."

Big, light boxes

Despite the burgeoning demand for small laser printers, larger, xerographic machines aren't going away, asserts Webb Castor. These machines have brought many advantages to the workplace. "A product like the Xerox 2700 can be equated to a 600-line-per-minute impact line printer," says Castor. "But the 2700 is quiet and simple to use, so it can be installed

(Continued on page 166)



According to Robert Wallace, president of Imagen Corp., Mountain View, CA, small lasers can benefit users stuck between daisywheels and typesetters.

Guide to Printers

(Continued from page 165)

anywhere—not just in the dp center. Xerox's big printer also prints 700 lines per minute, produces letter-quality print, accepts cut-sheet paper, and permits font selection. It only occupies 5 square feet of floor space and churns out 24 times as much as a daisywheel printer."

Some corporations use high-speed laser printers as in-house typesetting machines, and cut out costly and time-consuming production steps in the process. In the past, employee-benefit policyholders of Provident Life & Accident Co., Chattanooga, TN, had to wait six weeks for their employee-information booklets. The offset and letterpress printing the carrier used required elaborate setups that took time. For this reason, Provident customers would have to stock additional copies in order to meet the continuing demand.

Today, Provident's sales representatives can check off the list of benefits purchased by a customer, indicate the format to be used, and specify the necessary logos, signatures, and illustrations. If the text is made up of standard paragraphs, the customer can obtain between one to 1,000 copies in a day.

The machine that made life easier at Provident Life was the Xerox 9700, a



The Data General Dasher GPS dot-matrix machine operates at 400 lines per minute. The serial-interface model sells for \$2,995.

large, electronic printer that turns out documents at up to 120 pages a minute. Provident customers no longer have to hoard extra booklets—additional copies can be produced on demand. Best of all, the company saves \$50,000 a month in equipment, labor, and supply costs—savings that paid for the machine within a year. The 9700 sells for approximately \$390,000.

Other innovative laser printers are available from vendors such as Sperry

Corp. (Blue Bell, PA), Datagraphix (San Diego, CA), Storage Technology Corp. (Louisville, CO), NCR Corp. (Dayton, OH), and Recognition Equipment Inc. (Dallas). Capable of printing 200 to 300 pages per minute they sell in the range of \$200,000 to \$350,000.

IBM's 3800 laser printer is still a heavyweight contender. The Model 3 is capable of producing up to 20,040 lines per minute and, with programming enhancements, can create forms electronically, switching fonts and spacing increments several times in a single line. The price is over \$300,000.

Inking with ions

Vendors of data-processing gear often tout minor improvements as revolutionary. Ion-deposition machines, however, may be a real revolutionary development—a new way of putting characters and lines on paper. Several vendors offer versions of the basic engine with added features.

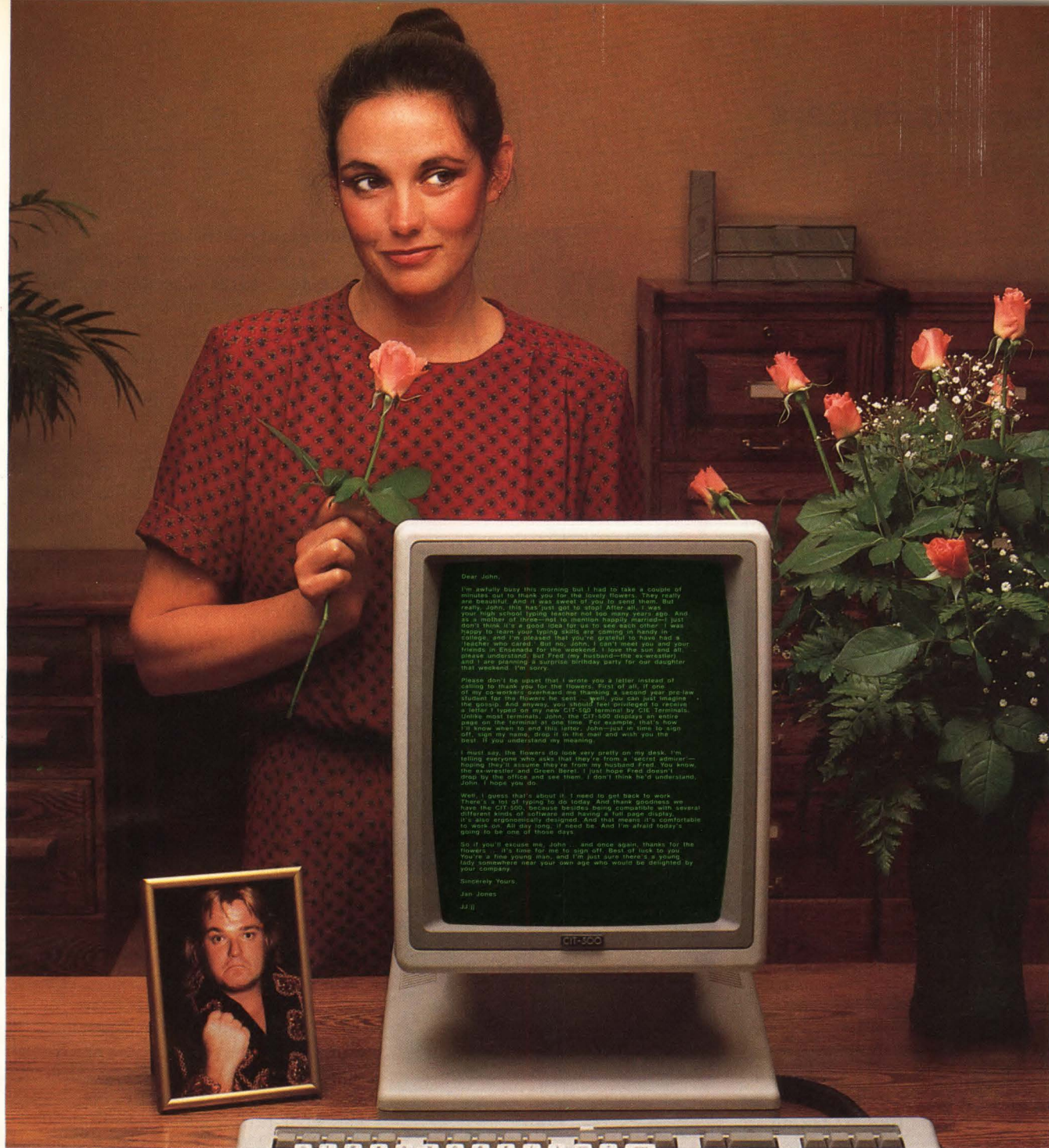
"Ion deposition is now a proven technology," says James W. Rule, printer-systems specialist at Southern Systems Inc. (Fort Lauderdale, FL). Southern Systems markets an ion-deposition printer, the Mercurion 1. "Compared to laser printing, it's more reliable." According to Rule, there are other advantages to using the ion-deposition printer. "It's almost as fast as the Xerox 8700 laser printer (60 pages per minute as opposed to 70), but the Mercurion sells for only \$70,000, while the 8700 is \$250,000 without options." He adds that the Mercurion can "plug and play" with 95 percent of the processors as an add-on, online emulator.

Nonetheless, Rule admits that the Xerox family of page printers has the edge in certain respects. "We don't have the high density of dots that Xerox has, 240 versus 300 dots per inch," he notes. "And Xerox offers more fonts." On the other hand, the Southern Systems machine is intended for data-processing applications such as documents, manuals, and near-letter-quality messages and reports—

(Continued on page 168)



"If you're going to get color monitors, you may want a color printer to complement them," says Ken Mathews, marketing vice president at Anadex Inc., Camarillo, CA. For economy, he suggests buying a black-ribbon machine that can be upgraded to color.



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Guide to Printers

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not for publication purposes.

Another ion-deposition machine is available from Paradyne Corp., Largo, FL. The Model 8360 page printer boasts communications support from the company's two systems, Pix and Pixnet, which permit remote-user control. The price is \$79,000. Like Southern System's Mercurion, the 8360 is built around an engine from Delphax Systems, Mississauga, Ontario.

"Everyone was excited when IBM came out with a high-speed impact line printer," reports Edward Webster, editor of *Printout*, referring to the new Model 4248 band printer, which operates at up to 3,600 lines per minute and costs \$99,000. "The Model 4248 proves that impact line printers aren't dead yet."

Band printers have long served as heavy-duty output devices in large mainframe operations. However, while band printers produce tremendous volumes of printout, they also create a good deal of noise and vibration. Other band printers are manufactured by Storage Technology Corp., Mannesmann Tally (Kent, WA) and Centronics Data Computer Corp. (Hudson, NH).

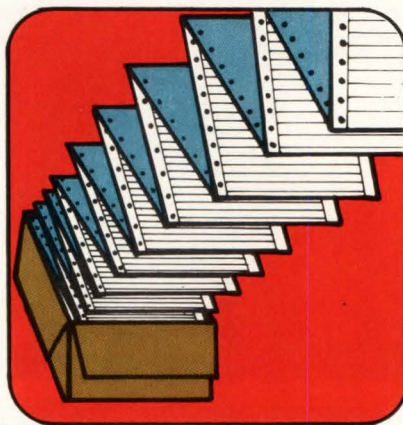
Dotting the landscape

Dot-matrix printers have long been associated with the unglamorous task of reducing data to paper during MIS/dp operations. But in case you haven't noticed, they're taking on some sex appeal: The machines look sleeker and—better yet—the type they print is now more pleasing to the eye.

There are more dot-matrix impact printers around than ever before. The spread of dot-matrix machines was prompted by the spread of personal computers in corporations.

Some of these machines sell for as low as a few hundred dollars. For example, Cal-Abo Peripherals Division, Van Nuys, CA, lists its Legend 800 at less than \$350. It prints 80 characters per second.

"Dedicated word processing is going out of style, and general-purpose workstations are proliferating," says



Edward Webster. "It's a rapid evolution in OA, with multi-mode impact-matrix printers becoming very cheap. They offer near-letter-quality print. It's not letter-quality, but it's still pretty good."

Many small desk-top printers can perform on two or three levels, depending on the needs of the user. All dot-printing devices work, for example, on the fast-and-legible level, usually labeled "draft mode." But



Hewlett-Packard's Laserjet is fast, quiet and—at \$3,500—reasonably priced.

many can also produce printouts of near-letter quality at a slower speed. Finally, there are small printers that are capable of producing letter, or "correspondence," quality.

Whether you use a desk-top or a mainframe machine, legibility is one of the principal features that most users will look for in a printer. Although dot-matrix printers may never turn out alphanumerics as readable as those printed by electric typewriters or daisywheel printers, they often come close. Indeed, for certain applications, like preparing a rough report for your department, a high-grade, dot-matrix

printer may be sufficient.

Nonetheless, many executives would never agree to sending out important letters or reports created from anything less than clean, clear type—such as that produced by electric typewriters or daisywheel printers. In this case, appearance is essential and speed secondary.

Some machines can give executives both speed and clean print. For instance, Dataproducts, Woodland Hills, CA, offers the Model 8010, which produces data-processing output at 180 characters per second (cps), business output at 90 cps, and word-processing output at 30 cps. It sells for \$649.

In the next price bracket, CIE Terminals, Los Angeles, has the multi-mode CI-3500/Model 10, which is less than five inches high and costs \$1,195. Telex Computer Products Inc., Tulsa, OK, offers a replacement for the IBM 3287 printer, the Telex 387. Telex 387, which sells for \$7,200, prints up to 400 cps in its faster mode, and 140 cps with a special print head to generate better-quality output.

The Dasher GPS printer, as its name implies, also works at high speed: 400 lines per minute. From Data General Corp., Westboro, MA, the Dasher GPS is intended for medium-duty applications, including graphics, and its price is approximately \$2,995. The DS220, from Datasouth Corp., Charlotte, NC, offers high performance, operating at 40, 100, or 220 characters per second. It costs \$1,195. AT&T's Teletype Corp., Skokie, IL, offers a line of dot-matrix printers with switchable functions and optional detachable keyboards. The 5300 Series is priced from \$1,315 to \$2,463.

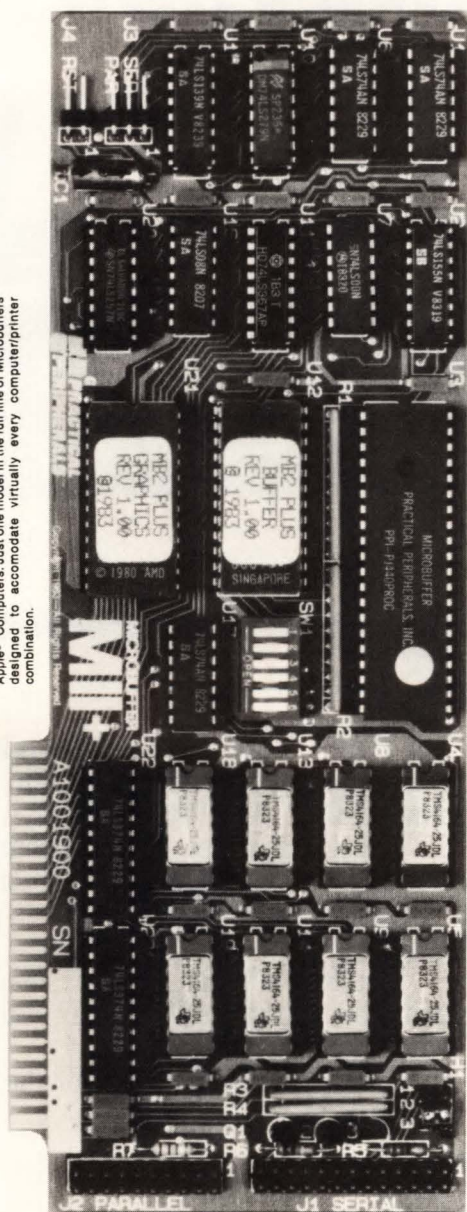
A more colorful future?

Improving the quality of type on a printout is one way to enhance its appearance. Another method is to add color. Several vendors offer machines that can print color. The Color/Scribe (Camarillo, CA) dot-matrix printer from Anadex Inc. turns out 15 different colors from a red-yellow-black rib-

(Continued on page 172)

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Pictured here, our Microbuffer II+, with features to complement the Apple® Computers. Just one model in the full line of Microbuffer designed to accommodate virtually every computer/printer combination.



Like all Microbuffer models, the Microbuffer II+ eliminates waiting for your printer to finish before you can use your computer again. It allows you to print and process simultaneously.

But the Microbuffer II+ has one unique quality not found in any other Microbuffer: it can be used with virtually any printer—serial or parallel, or both at once!

If you have an Apple II, II+, II/e and more than one printer, Microbuffer II+ can eliminate a tremendous bottleneck.

While your parallel printer is going at full speed, your serial printer can be printing the same file or a different file right along with it. And you can be using the Apple to do something else at the same time.

The Microbuffer II+ printer interface will fully support the Apple IIe 80-column format. And it allows an 80-column screen dump from the Videx™ 80-column board in your Apple II or II+.

Perhaps, best of all, Microbuffer II+ is versatile and smart. It supports over 30 commands for text formatting, sending printer controls, printing screen dumps and setting up the MII+ itself. AND it includes graphics print routines for nine popular printers as well as 8 additional graphics printing commands. Whether you have 1 printer or 2. Microbuffer gives you the maximum amount of printing flexibility in the minimum amount of time.

The new Microbuffer II+ is available now in 16K, 32K, and 64K models. Ask your dealer for a demonstration, or for further information.

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SO WHAT ARE YOU WAITING FOR?™

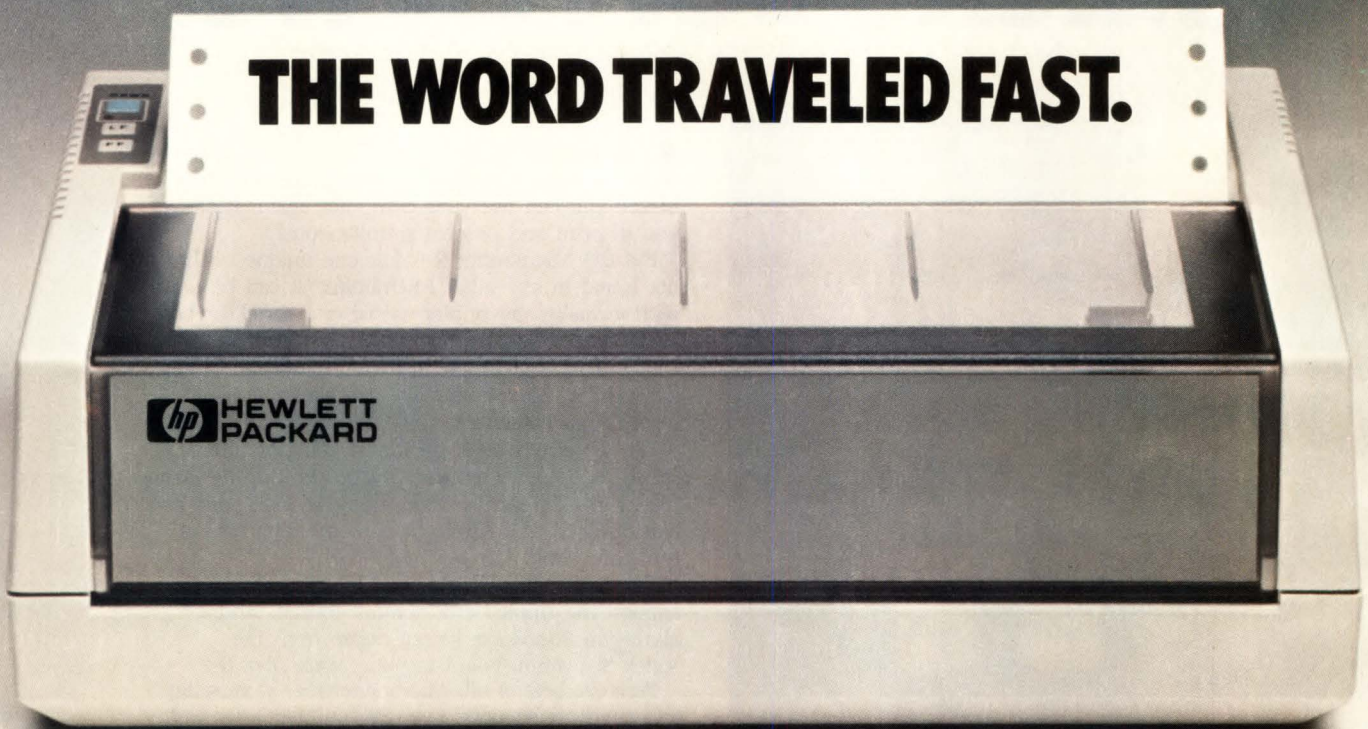
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PRINTER THAT USES A QUIET JET OF INK,
PRINTS 150 CHARACTERS PER SECOND
AND COSTS ONLY \$495,**

THE WORD TRAVELED FAST.



THINKJET.

Hewlett-Packard research has used inkjet technology to make the ThinkJet personal computer printer surprisingly quiet while printing 150 high quality, dot-matrix characters per second for text or graphics. The ThinkJet printer weighs only 6½ pounds and it takes up just a bit more room than your telephone. So, it can work right on your desk. There's even a battery-powered model that lets you print anywhere. And, the ThinkJet printer's ink supply and printhead are designed in one neat disposable unit that simply clicks out when it's time to change.

The ThinkJet printer will work with most popular personal computers, including Hewlett-Packard, IBM®, COMPAQ™, TI®, or Apple II®.

Finally, as quiet, fast and compact as the ThinkJet printer is, it still has one more feature that's going to cause a commotion; its price... \$495.00*

See the entire family of personal computers, software and peripherals at your authorized Hewlett-Packard dealer.

Call (800) FOR-HP-PC for the dealer nearest you.

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**WHEN HEWLETT-PACKARD USED
LASER TECHNOLOGY TO BRING YOUR
PERSONAL COMPUTER A LETTER QUALITY
PRINTER THAT OPERATES AT UP TO
300 CHARACTERS PER SECOND,**



LASERJET.

Now you can print an entire page of text in just 7½ seconds. That's the equivalent of 300 characters per second. The LaserJet personal computer printer can do it. Hewlett-Packard has brought the speed, quiet and letter quality of laser printing to the personal computer user for under \$3,500*.

The LaserJet printer is designed for Hewlett-Packard personal computers, the IBM® PC, PC

compatibles and most other personal computers.

No other personal computer printer is engineered to do what the LaserJet printer can do at such an affordable price. But then consider where it came from.

See the entire family of personal computers, software and peripherals at your authorized Hewlett-Packard dealer. Call (800) FOR-HP-PC for the dealer nearest you.

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Guide to Printers

(Continued from page 168)



Four Xerox 5700 electronic printers save \$200,000 a year at Westinghouse Electric Corp., Pittsburgh. Here, Kathy Yates holds a report that was printed at 43 pages a minute. The 5700 system starts at \$65,000.

bon, and costs \$1,625. This machine should not be confused with the Model 1200 Colorscribe, a \$1,995 dot-matrix printer from Infoscrite Inc., Santa Ana, CA, which prints business graphics in four colors and text in three modes.

Ken Mathews, marketing vice president of Anadex, sees an increase in the use of color in business. "Since the purchase of color monitors for personal computers is growing," he says, "you may want a color printer to complement them." If you're not ready for color just yet, Mathews suggests ob-

taining a black-ribbon machine that can be upgraded to color at little expense. Color/Scribe can be bought with a black ribbon and later converted to color for only \$125. Another choice is the JX-80 from Epson America Inc., Torrance, CA, which costs about \$800. The JX-80 is a seven-color machine that can also "draw" charts and graphs. Lear Siegler's (Anaheim, CA) VersaPrint 520 printer produces color graphics, operates at three speeds, and costs \$2,195. The AMT Office Printer, from Advanced Matrix Technology Inc., (Newbury Park, CA), sells for \$2,895.

Driving wires against a multi-colored ribbon is not the only way that color can be applied to film. A non-impact method is accomplished by squirting droplets of special inks from nozzles. One of the virtues of the ink-jet printer is that it works silently, making it perfect for offices. Like dot-matrix printers, ink jets create alphanumeric, symbols, and lines from dots arranged in patterns.

Office-automation managers have been slow to pick up on these printers, largely because of technical problems like the clogging of ink jets. Today vendors claim that all of the bugs have been worked out. But ink-jets have one drawback: A single machine can't produce letter-quality text *and* high-resolution graphics.

Printer options span a wide price range. Exxon Office Systems, Stamford, CT, offers its 965 Ink Jet Printer

with eight type styles, a speed of 900 words per minute, and a price of \$3,750 (with one font). Able to print on transparency film as well as on paper, the ACT II machine from Advanced Color Technology, Chelmsford, MA, sells for \$6,150. The Series C ink-jet printer from Diablo Systems Inc., Fremont, CA, places 120 dots per square inch in seven colors, for \$1,250. On the low end of the price scale, Hewlett-Packard offers the Thinkjet for \$495, making it attractive to users accustomed to small, inexpensive dot-matrix and daisywheel devices.

The circulatory systems

For applications demanding sharp, highly legible output, daisywheel and "thimble" printers have been the choice of many users. They've generally been preferred for correspondence, reports, and formal documents prepared for executives or clients. Although they are favored for their high-quality production, the machines are slow, and changing type fonts is cumbersome.

As a rule, daisywheels and thimble printers are usually more expensive than dot-matrix machines. Many fall into the \$1,000 to \$2,000 range. The Sprint 11/40 Plus, sold by Qume, San Jose, CA, puts alphanumerics on paper at 40 cps when plugged into an IBM PC and costs \$1,871. At \$1,595, the new Diablo Series 36 machine from Diablo Systems, Fremont, CA, operating at a speed of 30 to 40 cps, fits into this category. So does the more expensive Model 5055 from Amdek, Elk Grove Village, IL, which prints at 55 cps and stores data in a 2-Kbyte buffer; it sells for \$1,995. Beyond the \$2,000 boundary lie daisywheels made by Dataproducts, Fujitsu America Inc. (San Jose, CA), Diablo, Telex, C. Itoh Electronics (Los Angeles), and Printer Systems Corp. (Gaithersburg, MD), among others.

Many of the smaller, less expensive daisywheels are designed for personal computers, small systems, or even portables. The experts argue that new, small lasers and the near-letter-quality, dot-matrix machines are better than daisywheels. For example,



"Ion deposition is now a proven technology," says James Rule, printer-systems specialist at Southern Systems Inc., Fort Lauderdale, FL. "Compared to laser printing, it's more reliable."



**Genicom would like to get personal with you.
On a professional level, of course.**



Personal computers have become a valuable asset in business. The problem is that most personal computer systems are originally sold with "personal printers"...printers built for home use, not for heavier business work.

These "personal printers" are too slow for many business needs. They can tie-up your computer for extended periods of time...time you could be using to do other work.

Another problem is durability. In business, you need a printer that can produce high volume output over a long duty cycle. The common "personal printer" will often just quit under such continuous operation.

That's why Genicom has created the 3014, 3024, 3184, 3304 and 3404...professional printers built for personal computers.

Price/performance matched for small business systems, the Genicom 3000 PC printers are designed to increase productivity and maximize the value of your personal computer.

The 3000 PC printers provide 160-400 cps draft, 80-200 cps memo, and 32-100 cps NLQ printing...performance for both high productivity and high quality printing.

The 3014/3024 models print 132 columns. The 3184, 3304

and 3404 models give you a full 136 column width, and offer color printing as well.

Each printer is easy to use, lightweight, functionally styled and attractive. And you can choose options from pedestals and paper racks to document inserters, sheet feeders and 8K character buffer expansion, plus more.

Genicom 3000 PC printers feature switch selectable hardware, dual connectors and dual parallel or serial interfaces. Plus the 3014 and 3024 emulate popular protocols for both Epson MX with GRAFTRAX-PLUS™ and Okidata Microline 84 Step 2™, while the 3184, 3304 and 3404 emulate popular protocols for Epson MX with GRAFTRAX-PLUS™. So your current system is most likely already capable of working with these Genicom printers without modification.

Most important, the Genicom 3000 PC printers are quality-built, highly durable printers designed for rapid, continuous duty cycle printing. So take some personal advice. Get a Genicom professional printer for your personal computer today.

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Okidata Microline 84 Step 2 is a trademark of Okidata Corporation

Guide to Printers

(Continued from page 172)

the SP320 daisywheel printer from Fujitsu costs \$945. It offers both 96-character and 127-character printwheels. Tandy Corp. (Radio Shack), Fort Worth, TX, sells the DWP-210, which makes an original and two copies at 200 words per minute, for

\$799. Swintec Corp., East Rutherford, NJ, shaves costs with its \$649, 20-cps Compumate 2100. Abati Products, Fountain Valley, CA, sells a \$479 letter-quality printer called the LQ-20.

Thermal printers fill a special niche

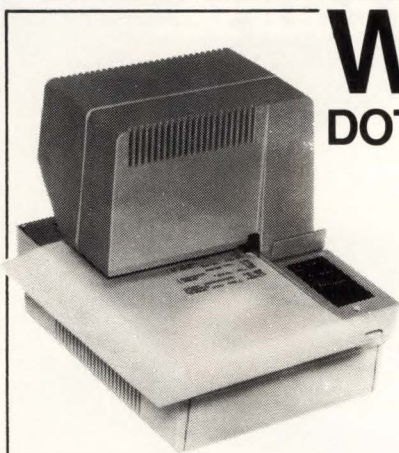
at the low-price end of the printer spectrum. They're generally compact, lightweight, and designed for light use.

Computer Devices Inc., Nutting Lake, MA, offers Series 2000, a portable thermal printer-terminal. Printing 80 or 132 characters per line, it has several options for communicating with mainframes, networks, or timesharing services. The Series 2000 sells for \$1,395. Computer Transceiver Systems Inc., Paramus, NJ, sells thermal printers at prices ranging from about \$1,000 to \$4,000. Thermal machines are also available from such vendors as Star Micronics Inc., New York; Digitec Corp., Dayton, OH; and Telpar Inc., Addison, TX.

Prospecting for printers

Here are some buying tips to help you carefully select the best printers for your company:

- Talk to someone who already owns the printer you're interested in buying.
- Look at more than one type of printer. The machine you thought was beyond your reach could be within your budget when all factors are considered.
- Buy a printer suited to the application—don't try to fit the application to the printer.
- Arrange for maintenance services to ensure that your printer won't be out of commission for long periods in case of a breakdown.
- Make certain you know what kind of paper—ordinary bond or coated—the printer needs. Determine which is more cost-effective to print from—continuous forms or cut sheets.
- In the case of nonimpact machines, ask whether the printer can generate its own forms or whether it requires preprinted forms.
- Work up figures on the cost and life expectancy of the ribbon cartridges you'll be using.
- Favor two- or three-mode dot-matrix printers over one-speed machines for versatility and longer life.
- Observe caution when considering new and unproved technologies or faddish machines. Shakeouts in the industry can leave you without service, support, or supplies. □



WESTREX DOT MATRIX PRINTERS

**NEW!
STAND-ALONE,
150 CPS
SLIP/DOCUMENT
PRINTERS**

**8000
SERIES**

MODELS 8400/8410

Model 8400 and Model 8410 are new, packaged, stand-alone, alphanumeric, bi-directional, flat bed, Slip/Document dot matrix printers. They print up to 40 columns at 12 characters per inch at 3 lines per second. Both models provide side or front form insertion; top and bottom-of-form sensors and adjustable Slip/Document Stop. The print head employs a 7-needle vertical array that permits selection of fonts and characters (5×7, double width, etc). The character set is fully alphanumeric under software control. The 100% duty cycle print head life is rated at 100 million characters.

Model 8400 and Model 8410 are complete with control and drive electronics. Serial RS-232C or TTY and parallel interfaces are available. Both units can provide multiple print lines and carbon or pressure sensitive copy.

Model 8410 additionally features a stepping motor paper drive system which permits variable and programmable forward/reverse line spacing for applications requiring line selection and/or unique form indexing.



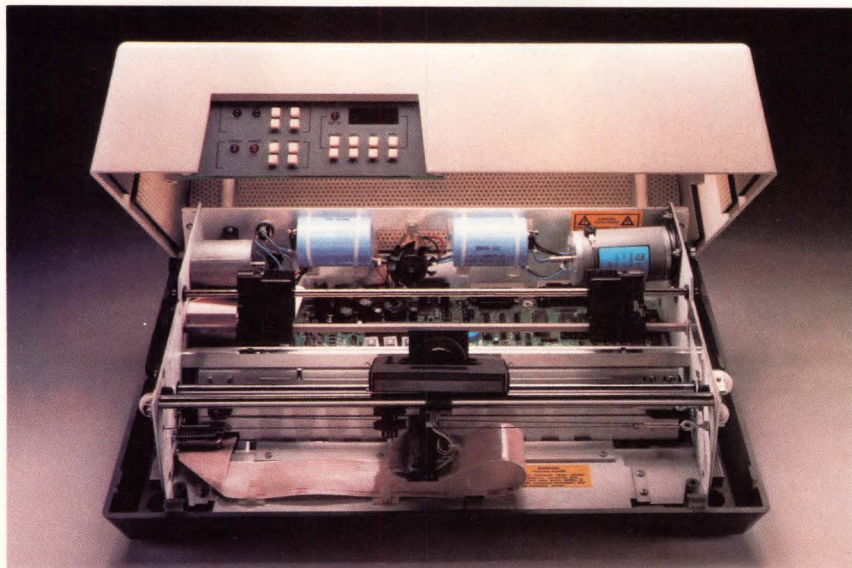
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HIGH PERFORMANCE

IT'S WHAT'S UNDER THE HOOD THAT COUNTS



Take a close look under the hood of a Datasouth printer. Inspect for loose parts, cheap fittings. Search for things that show more concern for speed on the assembly line than the communications line.

You won't find them. Instead you'll find the source of the Datasouth reputation: design, engineering and materials dedicated exclusively to *high performance* value.

Now look closer.

MORE THAN THE HUM OF ITS PARTS

Count the moving parts in a Datasouth printer. You won't find many. Most of those are dedicated to transporting the printhead and the paper from point to point with optimum speed and accuracy, while the rest of the printer sits quietly with the motionless authority of a Stonehenge.

And thinks.

Under the hood of every Datasouth printer is a highly intelligent microprocessor. Its sophisticated brainwork eliminates the need for many parts still common in other printers, and optimizes carriage and paper travel so the printhead intelligently follows the shortest path from one printable character to the next. So more work gets done with less strain on the machinery.

MODULAR MAINTENANCE

Datasouth design simplicity assures easy maintenance. All control electronics are on a single printed circuit board. The 9 wire printhead is rated at over 500 million characters, and is easily replaced in minutes.

Everything that matters is easy to reach, right there under the hood. Even the cartridge ribbon, rated at 3 to 4 million characters, snaps into place in seconds.

JUST TURN THE KEY

Datasouth printers are easily driven by virtually any mini or microcomputer. The fully instrumented dashboard allows the user to program up to 50 different applications features at the touch of a few buttons. Meanwhile, the digital readout shows everything from programming prompts to line count.

TAKE YOUR CHOICE

Datasouth reliability comes in two high performance models. The DS180 is a legendary workhorse that delivers crisp data quality printing at 180 CPS. The new multimode DS220 cruises at 220 CPS for high speed data printing and at 40 CPS for letter quality word processing. Both models print precision dot-addressable graphics.

If you have a high performance printing need, Datasouth has a high performance printer to fill it.

DRIVE ONE TO WORK TODAY

Both the DS180 and the DS220 are on display at more dealer showrooms every day, including one near you. So go take a hard look at the kind of hard copy you get from high performance Datasouth printers.

See what *really* counts when you compare printers.



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restarts a breeze. Ware it with **UCC-7** and your data center will almost run itself. **UCC-1.** The tape management industry standard. **UCC-1** virtually eliminates data losses while improving operating productivity. A companion to **UCC-1**, **UCC-1/VMTAPE** extends all facilities of **UCC-1** to the CMS user.

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UCC-10

UCC-8

UCC-4

UCC-2

UCC-20

UCC-10. A Data Dictionary/Manager which automates the communication and control needed to effectively manage the IMS data base operation.

UCC-8. An online, integrated system designed to manage the complex support activities of today's data centers. Key areas of use are: problem management, change management, customer support, inventory management and TP network control.

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UCC-20. An OS JCL Generator which works in conjunction with UCC-2 to ease the transition to OS.

Oops. **UCC-4**, UCCEL's newest hot number, is not quite ready yet. But when it is, this unique hardware accounting system will take the industry by storm. So ware the hottest numbers in systems software. Ware UCCEL. Because this year, more than ever before ... UCCEL's got your number.

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APPLICATION

The Wizard of electronic mail

Wizard Mail, an electronic-mail system, paid for itself within one month at Computer Resources, a Greenville, SC-based computer-service bureau. Users were so pleased, that Computer Resources' parent company—U.S. Shelter, a property-management company with \$45 million in revenues last year—has decided to install Wizard Mail for its users.

Computer Resources serves 300 clients statewide and grossed \$2.5 million last year. Wizard Mail, developed by Steel Heddle Manufacturing Co., also of Greenville, was installed on Computer Resources' network of IBM 3270 terminals as an experiment last November. The company didn't consider other packages, says Al Gossett, MIS director of U.S. Shelter. "For the small cost involved, it was the most practical way to go," he says. "What did we have to lose by spending a few hundred dollars?" Wizard Mail costs \$850.

The system's first challenge was to eliminate costly phone calls between Computer Resources' headquarters and its Columbia, SC, office 100 miles away. The client-services and systems and programming departments were running up big phone bills as they worked to meet the changing demands of customers. Ironically, Computer Resources had an IBM electronic-mail system on its network.

However, employees complained it was unreliable, and few used it. Wizard Mail, on the other hand, has caught on with Computer Resources' staff. It's already cut the cost of communications between Greenville and Columbia. Says Gossett, "Wizard Mail paid for itself by cutting the

employee is away from his or her phone. Those delivery systems are unreliable, however. With Wizard Mail, a message gets to its destination—no matter which terminal the recipient happens to be using. The system gives employees one of two one-line prompts—"You have mail" or "You

have urgent mail"—when a message is waiting. If the recipient is not signed on at a terminal, the system waits until he or she signs on before delivering the prompt.

Wizard Mail will soon be expanded to handle 40 users at Computer Resources and more than 200 users at U.S. Shelter. There is no limit to the number of users the system can accommodate. Because the system is easy to use, Gossett believes new users will start sending electronic messages soon after the expansion is complete. Ease of use has been the key to the success of Wizard Mail, he says. Computer Resources' employees quickly began using the system—without a costly training program. "We didn't send anyone

to training," he says. "We just had a discussion over the phone and sent them some manuals. They picked it up very quickly." Gossett expects U.S. Shelter's users to catch on just as fast.

Wizard Mail is used by other large organizations, including the United Nations. For more information, contact Steel Heddle at (803) 244-4110.

Circle 590



Bill Killen, systems programmer, uses Wizard Mail to send a message to a branch office via the corporation's network of IBM 3270 terminals.

phone bill by about \$5,000 a year."

At U.S. Shelter, Wizard Mail will carry communications between even more offices. The company expects it to help ensure that messages arrive at their destinations. Now, U.S. Shelter employees use interoffice mail to send documents to one another; phone messages are conveyed via the familiar pink phone-message slip when an

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NAMED CELLS AND BLOCKS	☒	☒	☒
CELL PROTECTION	☒	☒	☒
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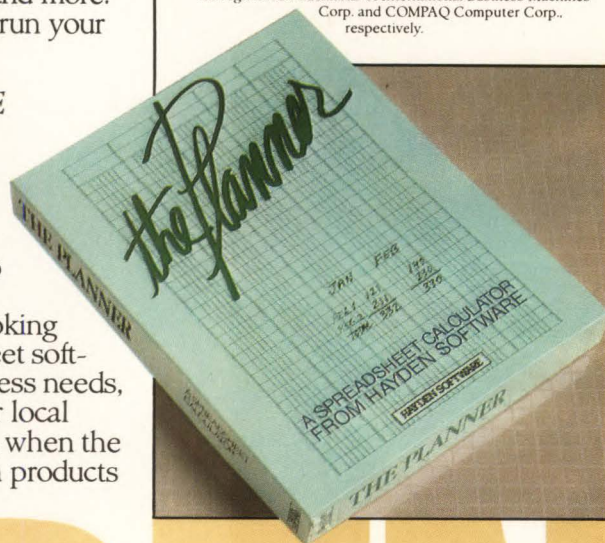
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	Wordstar	Bank Street Writer	THE WRITER
Full screen edit	✓	✓	✓
Justify left/right	✓	✓	✓
Search and replace	✓	✓	✓
Form letter merge	✓ (opt.)	✓	✓
Move text between documents	✓		✓
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Cut and paste	✓	✓	✓
Header/footer	✓	✓	✓
40/80 column modes	*	**	✓***
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600 Suffolk St., Lowell, MA 01853. The Writer runs on Apple II, II+, IIe, IIc, IBM PC, PCjr., PC XT, COMPAQ and other popular compatibles.

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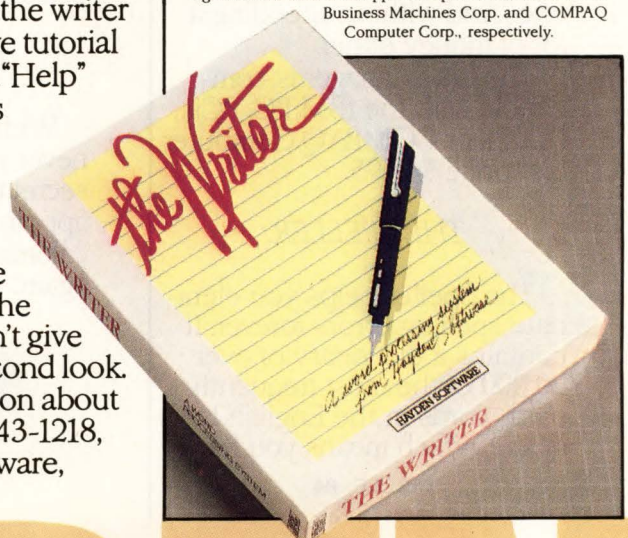
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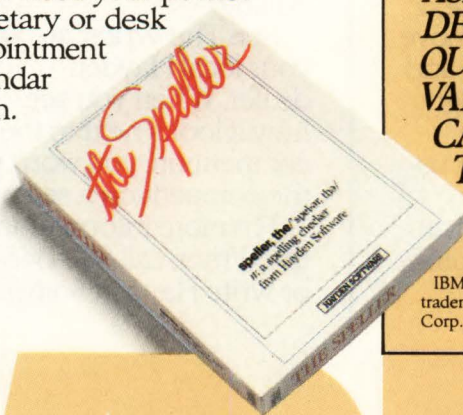
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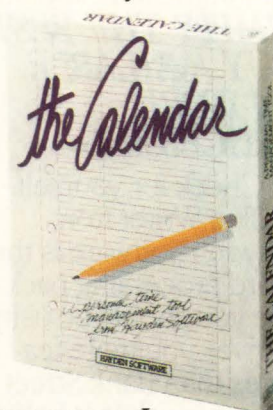
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HAYDEN

LETTERS

Macintosh's elegant expansion option

As a longtime user of microcomputers both in business and as a personal tool, I feel I must respond to "Building up your personal computers, Part IV: Expansion boards" [May]. The comments on the unexpandability of Apple's Macintosh are wrong and misleading. While it is true that the computer does not have in-board expansion slots, it is not true that it can't be expanded. It simply relies on a different concept for expansion.

To begin with, Macintosh has most of the ports that a typical business would want: a built-in RS-422A serial port for a modem, a built-in RS-422A serial port for a printer, a built-in port with controller for a hard disk (the operating system can support multiple volumes of 32 Mbytes each), a built-in port (and integrated software) for a mouse, and a built-in sound-synthesizer chip capable of voice simulation. These ports are *standard* at the regular price of \$2,495.

If you still need to expand your Macintosh, Apple has an elegant solution. The article failed to mention that whenever you insert a card into a computer, the memory map changes. This causes profound problems for programmers. For instance, not every piece of software written for the IBM Personal Computer will work with every IBM PC. Noting this problem, the Macintosh design team decided to make the Macintosh memory map permanent and unchanging. To expand this machine, one connects an intelligent expansion box to one of the RS-422A ports. Within this box, the user can insert whatever expansion cards he or she wishes to use. A programmer simply has to send signals (instructions or data) to the address of the port and the hardware within the expansion box will handle the routing of these signals.

I am disappointed with *Computer Decisions'* response to the Macintosh. The machine is elegant, sophisticated, and easily twice as powerful as the 8/16-bit 4MHz IBM PC. Macintosh truly is a step forward in computer design and power, and it is up to business now to decide whether it wants to step forward with this machine or, instead, to wallow in the mediocrity of "de facto" standards. The software that is

and will be developed for Macintosh will be vast, truly sophisticated, and powerful. I hope you at *Computer Decisions* will take a closer look at this machine. I would also like to see the debate over this extremely important development in micros opened up in your pages: I want to know who is and who is not purchasing the Mac over the PC and why or why not.

Paul B. Montano
Systems Manager
Colony Materials Inc.
Santa Fe, NM

Bubble burst

We were pleased to see Hicomp Computer Corp. and bubble memory included in your feature "Building up your personal computers, Part III: Storage devices" [April]. However, there was no mention in the article connecting Hicomp with bubble memory. In fact, there was no mention of what bubble products we offer. A more serious error, however, was a misrepresentation of the cost of bubble memory.

Hicomp offers a rugged, nonvolatile, fast alternative to floppy-disk storage for the IBM PC and compatibles. Our Bubble Drive functions as a disk when plugged into any available I/O slot in the PC. A boot-from-bubble feature allows the PC to operate without mechanical disk drives.

The price for 512 Kbytes of storage is \$1,495. The 256-Kbyte product sells for \$995. This is significantly less than the numbers given in your article.

Linda T. Burgess
Marketing Manager
Hicomp Computer Corp.
Redmond, WA

Editors' response: Sorry we didn't give more thorough coverage to bubble memory, but its use is still quite limited, compared to that of floppy-disk drives.

Ergonomics' value underestimated

Reading your March issue, I was surprised to find a rather derogatory estimate of the worth of adequate ergonomic design in the "Office automation" column. ["How to read OA advertising" by Randy J. Goldfield and Dan Burstein] advised readers to be-

ware of certain buzzwords in advertisements for office-automation products. The authors apparently have a severely limited perspective on the field of ergonomics ("How hard is it, after all, to raise or lower a keyboard or tilt a screen?"). Considering the recent impact of ergonomic considerations on nuclear power-plant safety, product liability, and other areas (including office design), the authors' dismissal of the profession seems somewhat premature.

In addition to the ignorance of ergonomics displayed by the authors, their compassion seems to be waning a bit as well ("The bottom line, in this less than perfect world, is productivity and profit, not the spring in the operator's step"). They must be unaware of standards already established in Europe, and contemplated by the National Institute of Occupational Safety and Health in this country, concerning workplace design and work/rest periods for video display terminal (VDT) operators. Perhaps the authors don't believe a required 15-minute break every hour will affect the bottom line. A recent study completed by the National Research Council for the National Academy of Sciences concluded that most complaints of fatigue and stress by VDT operators are the result of poor ergonomic design of their workplace.

I agree with the authors that certain advertising buzzwords should be greeted with skepticism, but the underlying principles of good ergonomic design should not be dismissed in favor of "more significant characteristics."

Michael E. Maddox
Search Technology Inc.
Norcross, GA

Randy Goldfield responds: The merits of ergonomics (of which we at Omni Group are fully cognizant) are, of course, important. But don't you think the importance of any potential feature pales in comparison to the need for a sense of perspective in the midst of the ridiculous unreality of OA advertising? Another, equally important, factor for all of us who work in this arena is a sense of humor about its ultimate importance. Apparently you did not recognize our tongue-in-cheek attitude.

Address letters to the editor to Computer Decisions, 10 Mulholland Dr., Hasbrouck Heights, NJ 07604.

BOOKS

Information Resource Management, by Donna Hussain and K.M. Hussain, Richard D. Irwin Inc., 645 pages, \$29.95.

Information Resource Management might be a good volume to help your company's nontechnical managers get a better idea of what MIS/dp is all about. Some managers might even read the whole book. But be warned that it's fairly heavy going.

Donna and K.M. Hussain, who teach at New Mexico State University (Las Cruces), wrote the book as a text for undergraduates and master's degree candidates. However, they say they also hope to reach managers responsible for computer resources.

The book begins with a brief discussion about the break-even points

for manual, electro-mechanical, and computerized data processing, but don't expect much on the question of whether or not to computerize a particular function. The Hussains assume that electronic data processing makes sense for corporations. With that assumption, they go on to explain how to implement computers: How to plan, evaluate, buy, monitor, and control an information system.

They define *information resources* in the first five chapters. The authors describe hardware, software, peripherals, and the data these are designed to process. They don't discuss the options available from different vendors.

The book has a few flaws. Notably, pages 67 through 74 were printed upside down and bound in reverse order—a foul-up that may have been

corrected in later editions. Also, the authors sometimes blur the distinction between mini- and microcomputers. In fact, in their glossary, the authors write that a mini might be purchased for the home to keep track of household expenses, menus, and bank accounts. A homeowner might find space for one of today's smaller minis, but the cost of it would break most family budgets. Further on in the glossary, the authors confuse *microcomputers* with *micro-processors* when they assert that the former are "generally designed for specific applications, such as use in microwave ovens or gas-station pumps."

The book contains no discussion of the relative merits of mainframes, minis, and micros for business, but then, it's a book about management, not

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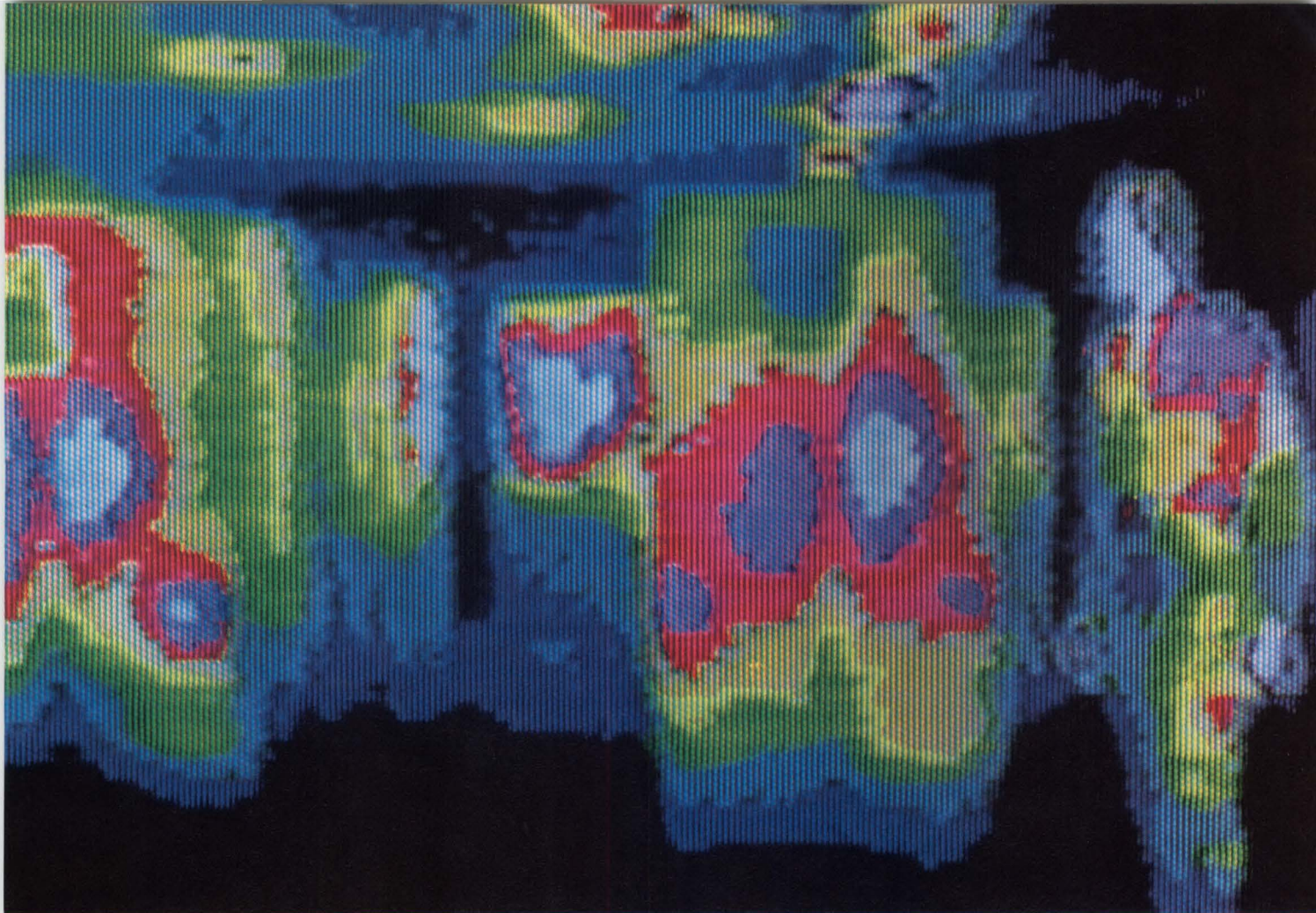
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BOOKS

computers. Topics covered in the main sections include vendor selection, financing, and contracts; planning and developing an information system, with a section on project management; evaluation of system performance; quality control; and privacy and secur-

ity. There are also sections on managing the data-processing system, including budgeting, standards, and change strategies; organization and staffing of computer departments; oversight committees; and using computer consultants and service bureaus.

Worth noting—despite its flaws—is the 10-page prose glossary, which can be read by itself for a quick understanding of computers and the computer industry. There is also a regular glossary with an index to the prose glossary, as well as a list of abbreviations and acronyms.

The book ends with an overview of the computer industry, the impact of computers on management, antitrust and copyright laws as they apply to computers, and factors affecting the success of information systems.

—Walter A. Koenig

***How to Buy the Right Small Business Computer System*, by C. Roger Smolin. John Wiley & Sons (1981), 156 pages, \$8.95.**

***So You Think You Need Your Own Business Computer*, by William E. Perry. John Wiley & Sons (1982), 201 pages, \$16.95.**

***How to Microcomputerize Your Business*, by Jules A. Cohen, with Catherine Scott McKinney and the Staff of Orbis. Prentice-Hall (1983), 180 pages, \$9.95 (\$18.95 cloth).**

These three volumes about buying small computer systems are aimed at owners of small businesses, but the principles they outline could be applied to any business operation. Planning, these authors say, is the key to success in computerizing a business. "You will never meet a computer user who regrets the amount of time spent in planning to install a computer, but you will meet thousands who wish they had devoted more time and effort to planning," writes William E. Perry in the preface to his *So You Think You Need Your Own Business Computer*.

Each of these books takes a different approach to planning the purchase of a small computer. Each has its good points, but—perhaps predictably—none of them tells you everything you need to know. Unfortunately, reading all three won't tell you *everything* you need to know, either. You still won't have much of an idea, for example, about how much you can expect to spend for what kind of equipment; admittedly, this is difficult because hardware and software prices vary greatly and are constantly changing. Nor will you know, because none of the books



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BOOKS

discusses it in any detail, about the possibility of renting or borrowing hardware and software for trial periods. Finally, none of these books tells how a department manager might seek help from within or outside his or her department to evaluate personal com-

puters, their potential impact on the organization as a whole, and how they might tie in with the company's existing MIS equipment.

What these books do give you is some understanding of small computers, how they might affect your oper-

ation, how to evaluate and buy them, and how to avoid potential problems. That's a good start, at least.

C. Roger Smolin's *How to Buy the Right Small Business Computer System* is written in an informal style that makes it easy to read and use. The newsprint paper on which it is printed suggests a workbook, and this impression is reinforced by the sample worksheets and blank pages for notes at the end of the book. The worksheets cover everything from evaluating software and hardware to a suggested "bug report"—for notifying manufacturers about problems that turn up after the computer is installed.

Smolin's writing is light and even humorous at times, but it is still informative. He manages to discuss the technical aspects of computers without getting bogged down in jargon. Particularly helpful in this respect is his description of computer systems in terms of what he calls "the primal system"—input, process, storage, and output. Any activity in life can be broken down into a system with these four functions, he says.

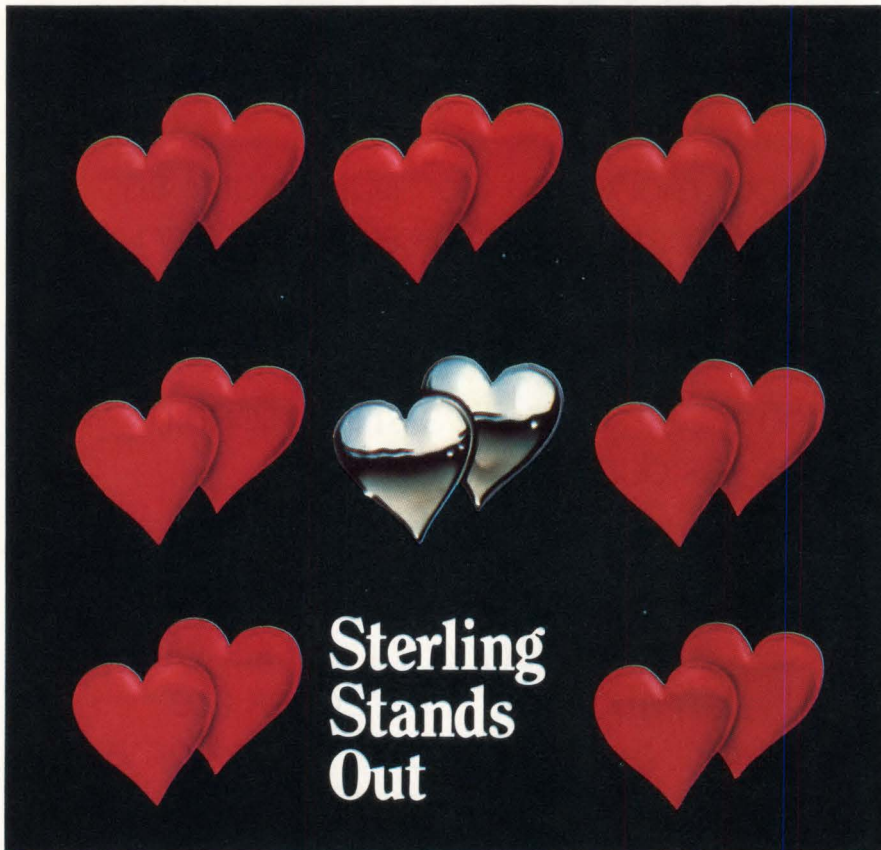
Smolin puts his emphasis on software. "What you buy when you computerize," he says, "is the programs. The hardware is simply an accessory that you must buy to help your software run."

Smolin also gives careful attention to software documentation, the written instructions for using a program. Here, his background as a programmer, systems analyst, and dp manager comes to the fore.

The author also discusses the good software that existed when he wrote his book in 1981, and this underscores one of the book's major weaknesses. There have been tremendous advances in micro technology in the past three years.

However, it's the principles that are important here, not the specifics. Smolin gives you some of the latter while properly emphasizing the former. If you're only going to read one book before rushing out to buy a microcomputer, this would be a good one.

In contrast, William E. Perry's *So You Think You Need Your Own Business Computer* is definitely not the first book you should read. The second or third, perhaps, but not the first. Except for a few brief sentences in the first chapter, Perry doesn't take the time to tell you what a computer is, much less



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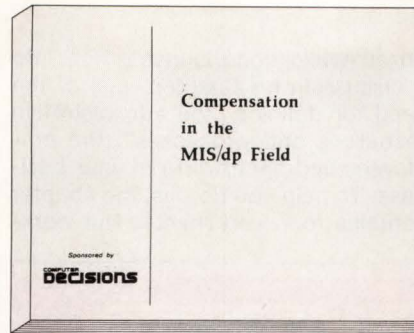
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BOOKS

what an entire computer system is. He does this as he goes along, which is confusing. It's doubly unfortunate, because Perry's writing tends heavily toward jargon and "computerese."

Perry, head of his own firm specializing in the control and audit of comput-

erized applications, launches right into a discussion (in Chapter One) of the need for defining "the administrative resources and processes" (the employees and paperwork) of your business. To help you do this, the chapter contains four worksheets. The work-

sheet is a keystone in Perry's approach to computerizing a business, and there are more than 30 sprinkled throughout the book.

The worksheets are valuable as guides, although most of them are probably too small to be used without either reproducing and enlarging them or copying them from scratch. Do you really want to do all this work? If so, do you have the time, the resources, and the patience? If so, you will probably like this book, and you'll probably end up with a good idea of which computer system to buy when you're all done. If you don't want to do that work (or lack the time, patience, or resources for it), well, you can do some of the work while reading about such topics as the risks involved in acquiring a computer (Chapter Three), the acquisition process (Chapter Four), and the organization and training of staff if you finally decide to buy a computer (Chapter Seven). All of this is worth reading.

So, for that matter, is *How to Computerize Your Business*, by Jules A. Cohen (with Catherine Scott McKinney and the staff of Orbis, a computer-services firm). Like Perry's book, Cohen's is not an "easy read."

Unlike the other two books, Cohen's does not emphasize the importance of software; hardware gets equal billing. Nor is the need for good software documentation stressed.

As in Perry's book, much space is devoted to systems documentation—that is, determining the informational requirements of a business. This is one of the book's strengths. Particularly valuable is its analysis of a business' needs in terms of computer-memory capacity and number of keystrokes needed to input data for particular forms.

However, Cohen and his fellow authors sometimes fail to take you by the hand and lead you through the documentation process. Particularly disappointing in this regard is a "case study" that takes up no less than 80 pages at the back of the book.

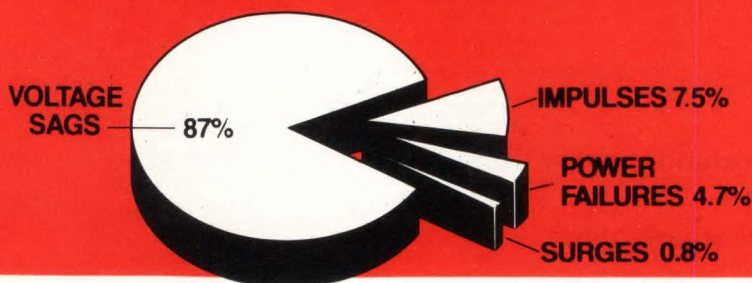
Having said all this, however, one must add that the book does contain much useful information. Discussed, if not dealt with in great detail, are such important factors in buying a computer as management emotions, employee feelings, planning for personnel needs, and providing for equipment maintenance.

—Walter A. Koenig

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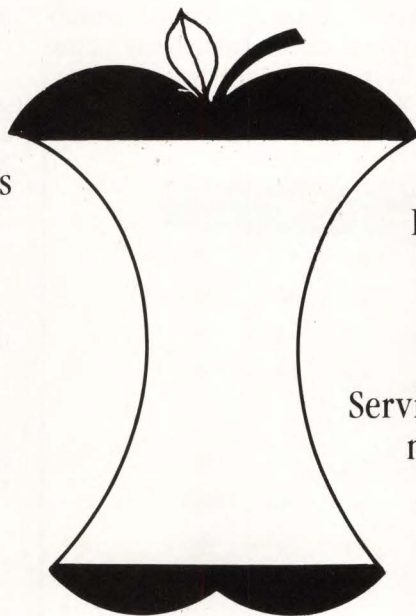
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*"The Quality of U.S. Commercial AC Power," Goldstein, M.; and Speranza, P.D.; IEEE April 1982.

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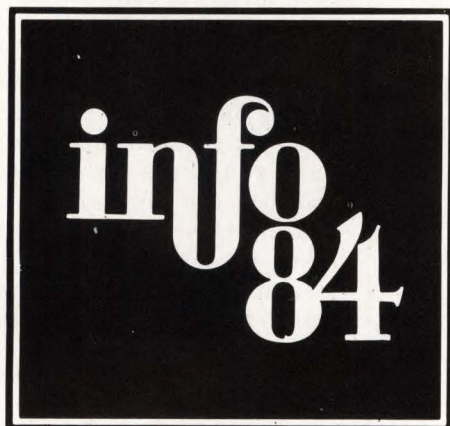
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Environmental Control, Part II

(Continued from page 160)

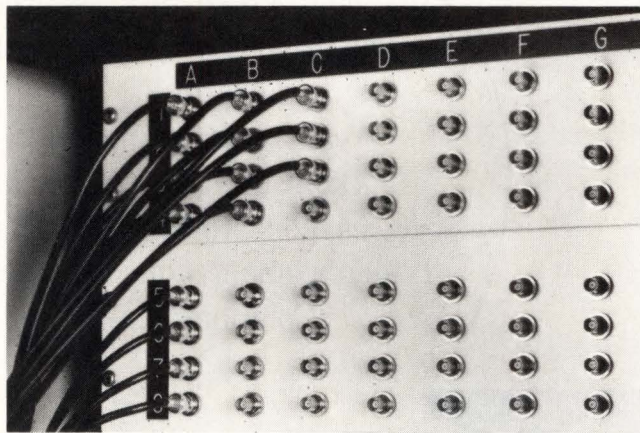
Dan Heinchon. "Many companies put their personal computers into an office with plush carpeting, generating tons of static. Just touching the computer can produce a charge that will ruin memory or destroy data." The best place to situate a personal com-

puter is in a tiled, non-carpeted workplace, Heinchon says. But considering most organizations' disinterest in building a special environment for each of its personal computers, static-resistant mats (contradictorily named "static mats") are the next best thing.

"The best mats are the ones that are grounded to the electrical system," Heinchon says. "They actually draw away the charge. Some mats act as insulators, just holding the static. The static is still there, but it can't escape."

Like Heinchon, Jerry Watson finds some mats are more useful than others. Watson, a systems analyst at Ford Motor Co. in Dearborn, MI, prefers desk-static mats over floor mats. "We were using floor mats," Watson says, "but our chairs were getting caught on them. If one of us rolled our chair off the mat, we'd have to get up, pick up the chair, and put it back on top of the mat."

Protecting a personal computer's operating environment shouldn't be a hassle. Watson is now using desk mats from Omnium Corp. that serve a pro-



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Despite oft-repeated reminders, users still eat snacks, drink, and smoke near their personal computers.

protective purpose without interfering with the operators of Ford's Fortune 32:16 microcomputers. Watson intimates that the mats were purchased primarily for the operators' peace of mind. "I'm not even sure we need the mats," he says. "They're just a precaution against losing data. Some of our operators had heard that static can cause buildup in a carpet and cause problems. If they really believe that, I'll go out and buy one of these static mats. It gives me one less personnel problem."

While Watson may only have been looking for an easy way to defuse an employee problem in his office, his dual concern—for his workers and their equipment—is exemplary. William O'Neil of First Boston believes any change made in a workplace to protect a personal computer will "make the office more comfortable for both the computer and its operator." Watson's approach meets both of these requirements. □

ONE SIZE FITS ALL VS. CUSTOM TAILORED

Remember the item you bought with the "one-size-fits-all" label? Maybe the arms were too long. Or it bagged at the waist. Or you buttoned it at the neck and found you couldn't swallow. So you vowed to choose more wisely next time.

Computer Decisions knows that "one-size-fits-all" doesn't fit anyone well. That's why we're not an all-purpose computer magazine. Or a general business publication. Or a newsweekly for the entire industry.

We custom-tailor our editorial to fit a single audience. Management. The MIS director who has come out of the back room into the boardroom. The corporate exec who's becoming more deeply involved with information resources. The financial vp who's suddenly buying not only his own personal computer, but a whole corporate information system. The Computer Decision Maker with purchase power for what you sell.

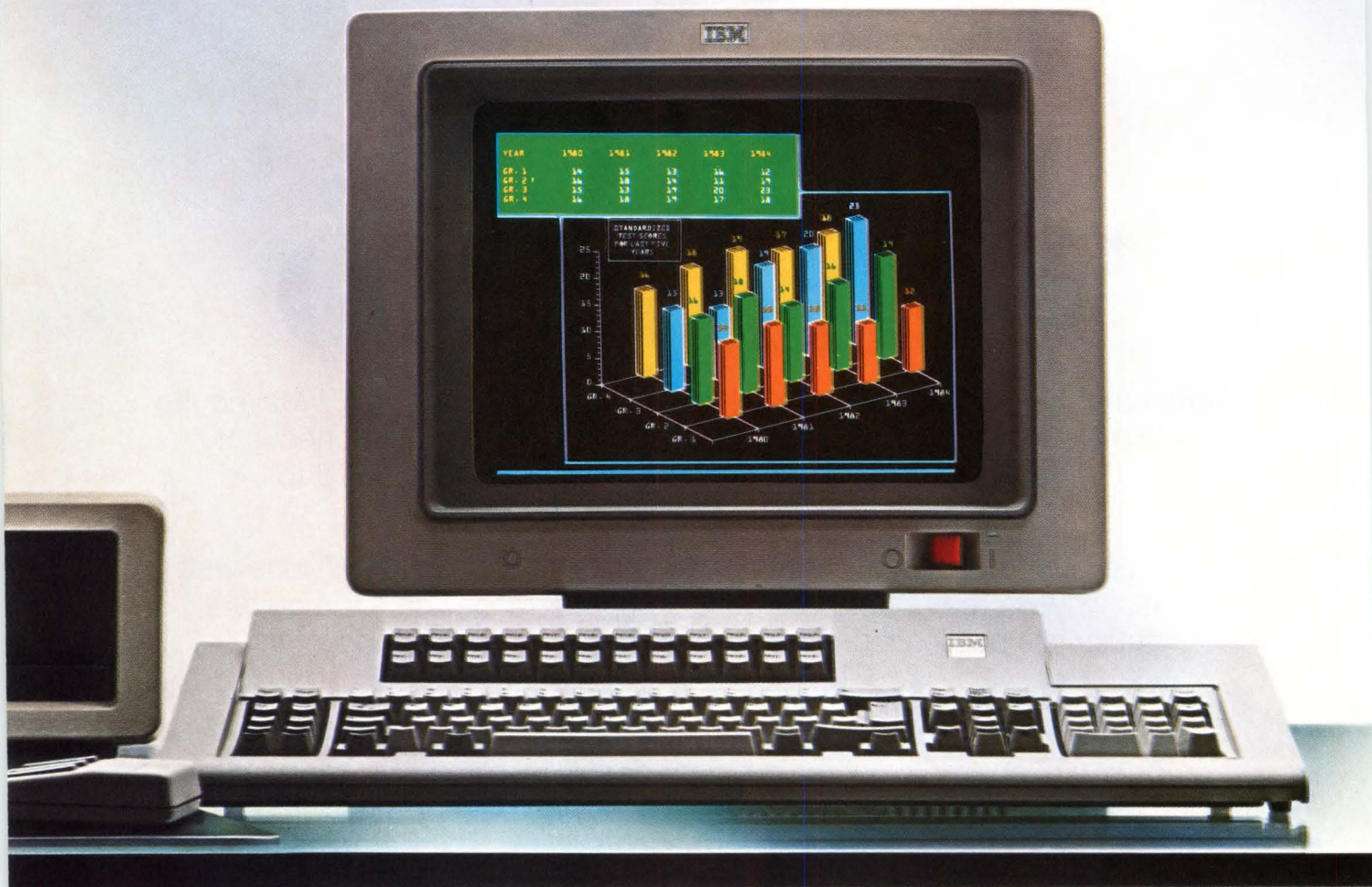
We tell our 100% management audience one thing: how to manage their human and information resources for greater profit and productivity.

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IBM 3270 PC/G

If one picture is worth a thousand words, your Smart Desk can tell you volumes.

Especially when it's equipped with a new IBM 3270 Personal Computer/G or GX.

These 3270 PCs let you create charts, graphs, 3-D technical diagrams and other high-resolution graphics right in the office. Or you can view engineering designs created on other IBM graphics systems.

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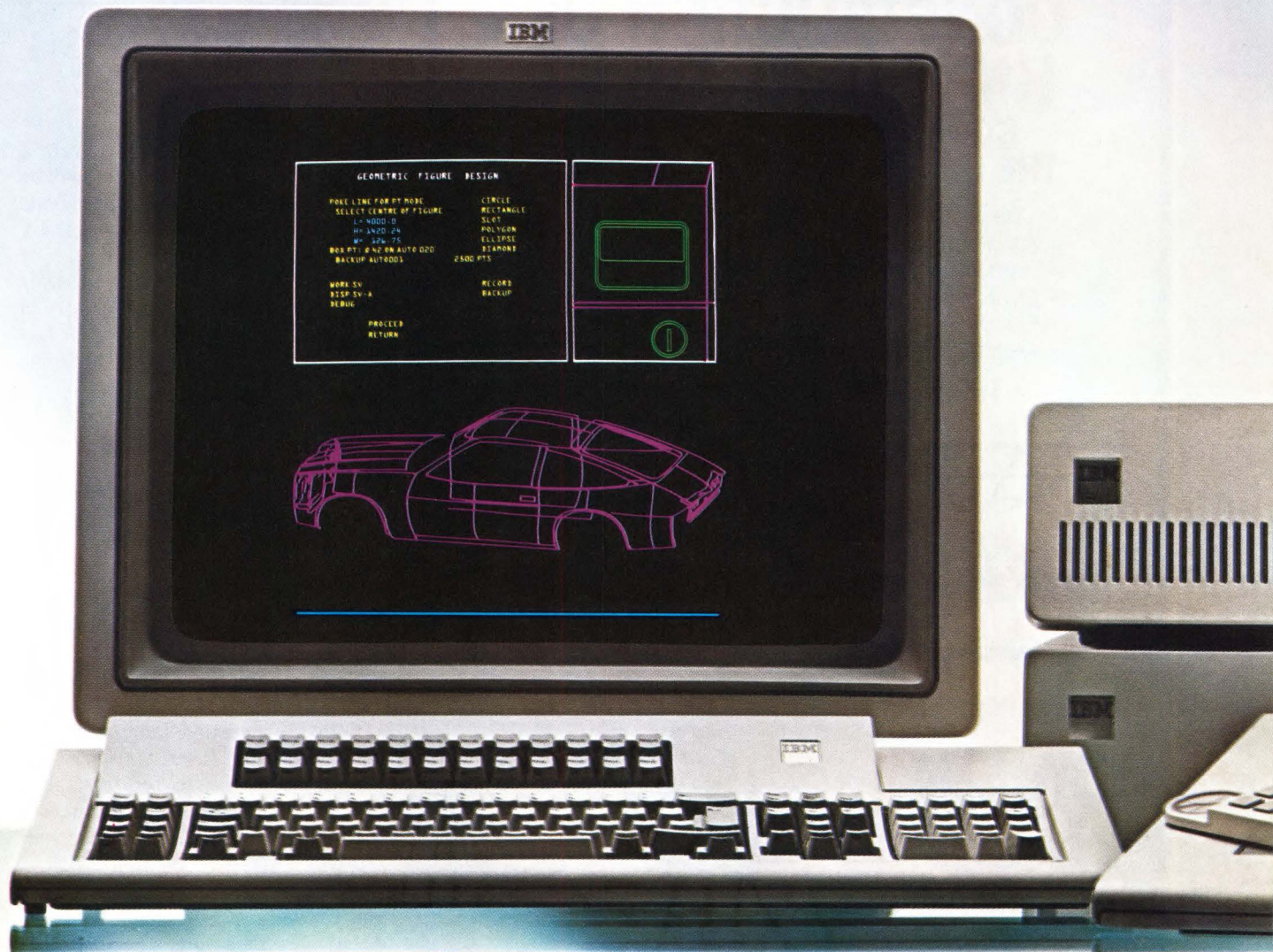
results: faster response time and more cost-effective performance.

The 3270 PC/G's 14-inch screen displays up to 8 colors with 76 PELs per inch; the 3270 PC/GX's 19-inch screen, up to 16 colors with 93 PELs per inch.

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And, because both of these new computers are IBM 3270 PCs, you get a lot more than just pretty pictures.

graphics using less host.



IBM 3270 PC/GX

Each system can display up to four different host sessions concurrently, and run a wide range of IBM Personal Computer applications. You also get two electronic notepads on screen for keeping track of important information.

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8-84

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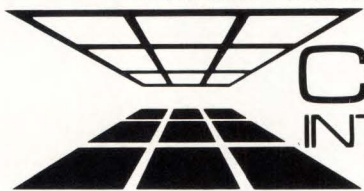
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CIRCLE 96

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CIRCLE 97

SHOW PREVIEW

Software/expo

Software/expo-National, a "software only" event, will be held in Chicago at the Hyatt Regency September 12 through 14. The show, now in its fifth year, is directed specifically toward the MIS/dp executive. Over 160 exhibitors in over 300 booths will display their latest products. More than 12,000 people are expected to attend.

Consultant Gerald Weinberg, the author of *The Psychology of Computer Programming*, will deliver the keynote address—"How to prevent a software quality crisis." The conference program will feature 20 sessions, including:

- Solutions to documentation problems. Polly Perryman, Documentation Services.
- Software and the legal web. Nancy Finn, Communications Resources.
- Fourth-generation languages. Jon Nackerud, Data Processing Services.
- Graphics software for managers. Douglas Neal, Decision Resources.
- Getting Uncle Sam to pay for your software. Attorney Clinton Krislow, Boodell, Sears, Sugrue, Giambalbo, and Crowley.
- Info-center software. Brant Serxner and Lee Thompson, Rush Presbyterian St. Luke's Hospital.
- Systems development. Ted Eaton, Codex Corp.
- Presentation skills for the technical professional. Annette Grant, Executive Speaking.

A keynote luncheon, addressed by Arnie Keller, vice president and group publisher of *Infosystems* magazine—the show sponsor—will focus on the problems MIS executives and managers face when trying to choose from among the wide array of software products presently available.

The fee for the complete conference and show is \$325, with a 10 percent team registration discount (three persons or more). The one-day price is \$110. For more information on the show call (312) 299-3131. □

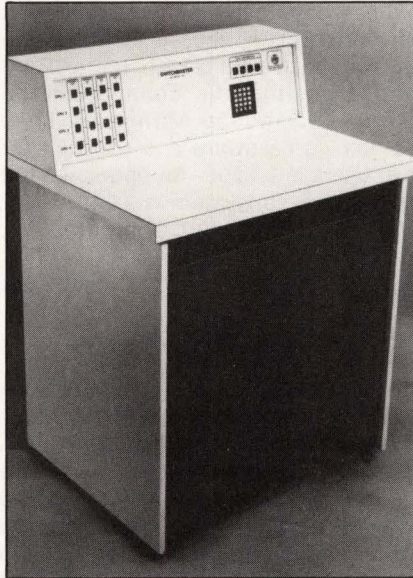
PERIPHERALS

Long-axis plotter

The HP 7586B multi-user, high-volume drafting plotter accommodates both cut-sheet media, from A4/A through AO/E, and roll media from 10.5 to 36.2 inches wide by 150 feet long. It draws frame-to-frame long-axis plots up to the length of the roll medium. Price: \$21,900. Two earlier models, the AI/D-size HP 7580B and the AO/E-size HP 7585B, which have no roll-feed and long-axis capability, have been enhanced with greater plotting intelligence and have been reduced in price. The 7580B was reduced from \$16,100 to \$13,900, and the 7585B from \$22,900 to \$16,900.

Hewlett-Packard, (Call local sales office.)

CIRCLE 271



VAX memory

A double-density memory card enables the VAX 11/780 to have up to 32 Mbytes of 64K RAM in the cpu cabinet. Price: \$5,100. Using DEC-made 1-Mbyte arrays, the 780 can be configured with 16 Mbytes in the cpu cabinet and 16 Mbytes in an expansion cabinet using a second memory system. With its double-density memory, 2 Mbytes can be put in each memory slot so an additional cabinet and chassis aren't needed.

EMC Corp., 12 Mercer Rd., Natick, MA 01760.
(617) 655-6600.

CIRCLE 264

Color transparencies

IFT-50, a color overhead transparency, is used with the Act II Chromajet Series of color ink-jet printers. The transparencies, which come in boxes of 50, are 11-inch-by-11-inch and cost \$1.75 per sheet.

Advanced Color Technology Inc., 21 Alpha Rd., Chelmsford, MA 01824.
(617) 256-1222.

CIRCLE 265

Cpu channel switch

The 880VS Series Cpu/Channel Switch gives users of IBM and compatible mainframes a virtually unlimited interface-switching network.

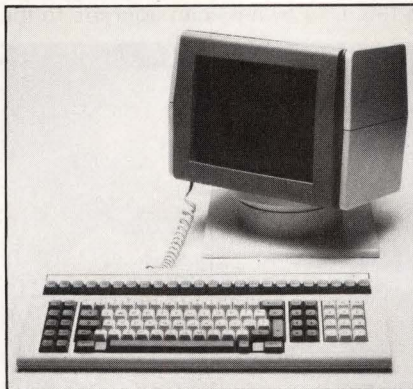
Prices start at \$3,300. It allows switching between up to 16 mainframes. The channel switch is operable 600 feet from the mainframe and an optional extender drives signals another 400 feet. Channel Extender is \$3,000. A redundant power supply guarantees preservation of data in case of a power failure. Front-panel display indicates the routing being used.

DDRI, 25 Mitchell Blvd., San Rafael, CA 94903.
(415) 499-8870.

CIRCLE 266

327X terminal

The Fame 78 is an ASCII terminal for the IBM 327X. Price is under \$1,000. The Fame 78 has an IBM 3278-style keyboard with 80-column by 24-line



display plus 25th status line, crt-control circuit for a separate sync/video monitor, and two RS-232C ports. A 14-inch screen is also available.

Falco Data Products Inc., 1286 Lawrence Station Rd., Sunnyvale, CA 94089.

(408) 745-7123.

CIRCLE 267

Smart display

The Freedom 110 smart video-display terminal features 24-line-by-80-character display with 25th status line, 10 programmable nonvolatile function keys, 15 graphic characters, eight editing keys, eight foreign-character sets, four modes, and bidirectional buffered auxiliary port. Price: \$595. Optional amber-phosphor display is \$25. It emulates the Televideo 910, ADDS Regent 25, Lear Siegler ADM 3A/5, and Hazeltine 1420.

Liberty Electronics, 625 Third St., San Francisco, CA 94107.
(415) 543-7000.

CIRCLE 268

IBM subsystems

A line of 1/2-inch, 9-track magnetic-tape subsystems for the System/34, /36, and /38 are IBM/ANSI/ECMA-compatible. The three models are priced at \$6,495, \$7,495, and \$8,495, depending on tape-transport performance.

Innovative Data Technology, 4060 San Morena Blvd., P.O. Box 178160, San Diego, CA 92117.

(619) 270-3990.

CIRCLE 269

Matrix printer

The Telex 387 table-top printer is plug-compatible with the IBM 3274/3276 control unit. Price: \$7,200. It prints an 8-by-7 dot matrix at 400 cps and has a near-letter quality option. Features include a choice of ASCII-B or EBCDIC character sets, international character set, underscore, bold print, 136 and 233 print positions, selectable vertical spacing, and buffer.

Telex, 6422 E. 41st., Tulsa, OK 74135.
(918) 627-1111.

CIRCLE 270

MICROSYSTEMS PLUS

Apple phone link

Habadex, a telephone-management system for the Apple III, consists of software and a plug-in phone. It costs \$595 and records all calls, calculates and bills their costs, and keeps track of 6,000 names, addresses, and phone numbers. It also contains a report generator for mailing lists, a calendar and appointment book, and a memory manager for changing applications easily. A version without the phone card is \$295.

Haba Systems Inc., 15154 Stagg St., Van Nuys, CA 91405.
(213) 901-8828.

CIRCLE 201

PC control packs

The Under-Control file-management system for the IBM PC and XT offers automatic screen generation, sorting, report writing, and record selection. Price: \$125. Gantt-It, which costs \$195, consists of Under-Control plus a project-control system. It collects time and expense transactions in a transaction file and allocates costs by account, department, type of resource, person, or other category. Gantt charts of tasks may be printed up to 999 characters wide.

Software, Inc., 16 Academy St., Skaneateles, NY 13152.
(315) 685-6918.

CIRCLE 202

Macintosh storage

Mac Disk is a line of hard-disk storage systems to expand the capacity of the Apple Macintosh for business applications. They range from 5 to 40 Mbytes and cost \$1,995 to \$4,495.

Davong Systems Inc., 217 Humboldt Ct., Sunnyvale, CA 94086.
(408) 734-4900.

CIRCLE 203

DG adds CP/M

The Mirage System from RDS of New York allows CP/M-80 personal-computer programs to be run on the Data General Eclipse/MV family of tems. A complete Mirage package containing hardware and software for two users is \$3,295. The Mirage M102

Processor, which fits any I/O slot in a standard Eclipse chassis, contains two micros, each with 64 Kbytes of RAM and asynchronous communication ports. A complete Mirage package containing hardware and software for two users is \$3,295. An optional F100 floppy-disk subsystem is \$1,495.

Data General, 4400 Computer Dr., Westboro, MA 01581.
(617) 366-8911.

CIRCLE 204

TRS-80 interface

A Disk Video Interface is available for the TRS-80 Model 100. A 5¼-inch floppy disk controls the built-in floppy-disk-drive unit as well as a second optional 5¼-inch unit. Price: \$799. The video interface allows the Model 100 to be connected to a standard video monitor or television set. The optional second floppy-disk drive is \$240.

Tandy Corp./Radio Shack, 1800 One Tandy Ctr., Fort Worth, TX 76102.
(817) 390-3300.

CIRCLE 205

Upgraded Lisas

The Lisa 2 Series of 32-bit micros from Apple have 512 Kbytes of internal memory and the Macintosh operating system. Lisa 2 has a 3½-inch microdisk drive for mass storage and costs \$3,495. Lisa 2/5, with external 5-Mbyte hard disk, is priced at \$4,495. Lisa 2/10 has a built-in 10-Mbyte hard disk and costs \$5,495. An upgrade of the Lisa 2 to the 2/5 is \$595, and \$2,495 for the 2/10 upgrade; 512 Kbytes of add-on memory is \$1,495. The Macintosh Operating System is \$195. Lisa owners can upgrade to the



2/5 free of charge until June 1. Several software packages are available, including Lisa Office System, Lisalist, Lisawrite, Lisacalc, and Lisagraph—ranging from \$195 to \$395.

Apple Computer Inc., 20525 Mariani Ave., Cupertino, CA 95014.
(408) 996-1010.

CIRCLE 206

Apple file manager

Megafinder is a data-management program for the Apple II and ILe. It's also compatible with the Megawriter word processor. It costs \$150 and can maintain information in up to four sorted orders simultaneously—each of which may be sorted in up to five sublevels.

Megahaus Corp., 5703 Oberlin Dr., San Diego, CA 92121.
(619) 450-1230.

CIRCLE 207

Retrieval system

Finder is a powerful retrieval system for the IBM PC or XT, or TRS Models II, 12, and 16. Price: \$1,495. It's designed to store and retrieve textual information using very large databases and creates inverted files to index every word in the database rather than just keywords. As a result, words and terms can be combined in many ways, and information does not have to be highly organized.

Aaron/Smith Assoc. Inc., 1422 W. Peachtree St. N.W., Atlanta, GA 30309.
(404) 876-0085.

CIRCLE 208

Emulation software

Cx-Link software provides 3278 emulation and bidirectional file-transfer capability. It costs \$95 and enables an IBM PC to communicate with Cx-80 Data Exchange Products and any computers or peripherals attached to them. Thus, the PC can be linked to IBM or compatible mainframes as well as printers, autodial modems, minis, local processing, and shared mass storage.

Commtext Inc., Crofton Lane, Crofton, MD 21114.
(301) 721-3666.

CIRCLE 209

IBM PC networks

With an NMS custom-installed system, IBM PC workstations are linked to a corporation's mainframe, other PCs and external databases to form an integrated network. Prices begin at \$1,000 per PC workstation. With a combination of proprietary software tools and other application-development packages, the system is designed to fit specific user-defined tasks.

National Management Systems Ltd., 3337 Duke St., Alexandria, VA 22314. (703) 823-0300. **CIRCLE 210**

PC reads CP/M

Systran, running under CP/M-86 on the IBM Personal Computer or most other 8086 micros, moves data between MS-DOS and CP/M operating systems. MS-DOS is not needed; Systran produces readable MS-DOS disks from CP/M disks. Price: \$120. The utility requires two floppy-disk drives and 64K of memory.

Compuview Products Inc., 1955 Pauline Blvd., Ann Arbor, MI 48103. (313) 996-1299. **CIRCLE 211**

dBase II tools

dSolutions provides five menu-driven software tools for the dBase II database management system for micros. Price: \$39 per component. It consists of the multi-column report generator, versa label for label formatting, floppy tracker to create a directory file on each disk, global change search and replace utility, and public domain software, which gives examples and ideas for creating programs.

Data Based Solutions, 1975 Fifth Ave., San Diego, CA 92101. (619) 236-1182. **CIRCLE 212**

IMS software: Three packages give programmers nonprocedural Cobol for batch and online database referencing and for IMS/DC and CICS/VS terminal referencing. IP3-DB, IP3-DC, and IP3-CICS are available from CPI of Waitsfield, VT.

CIRCLE 213

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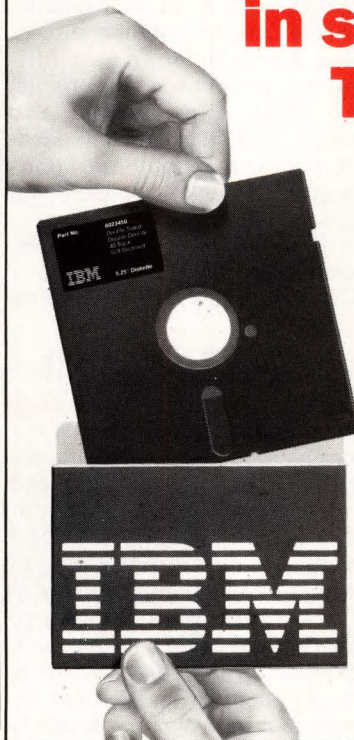
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*TYVEK is DuPont's trademark for spunbonded olefin. DuPont makes TYVEK, not sleeves.



CIRCLE 98

MICROSYSTEMS PLUS

Apple III file manager

Applefile III is a structured, high-capacity data-management program for organizing, managing, and maintaining large files on the Apple III. Users can store, arrange, review, and print records in files up to 16 Mbytes. The \$325 package handles multi-user applications and provides complete data integrity and record protection. It permits users to redesign files without retyping data, scan thousands of records by listing a summary portion of each record, print reports in rows and columns, summarize data with totals, averages, and counts, and organize information into any of eight orders or create a temporary order for printing reports.

Apple Computer Inc., 10260 Bandley Dr., Cupertino, CA 95014.
(408) 996-1010.

CIRCLE 222

PC interface for 9-track drives

The TDX-1000 $\frac{1}{2}$ -inch 9-track tape drive comes with a user-installable hardware-software interface that allows the IBM Personal Computer to read and write mainframe tapes. This



capability gives the PC access to almost every database. The complete package is \$6,000.

Telebyte Technology Inc., 148 New York Ave., Halesite, NY 11743.
(516) 423-3232.

CIRCLE 223

Facility lets PC access mainframe

ADR/PC Datacom is a relational information-management facility running under PC-DOS that allows data sharing and control between IBM Personal Computer workstations and IBM mainframes. PC users can access and ma-

nipulate data from one or more mainframes, and can distribute functions of ADR mainframe software. A portion of the mainframe's processing load can be transferred to the PC. Mainframe upgrade has a one-time charge of \$13,500 for OS and \$12,000 for DOS; each copy of the ADR/PC Datacom software is \$495.

Applied Data Research Inc., Route 206 & Orchard Rd., Princeton, NJ 08540.

(201) 874-9000.

CIRCLE 224

Unix-based system

The 7350 Professional Computer can be used as a stand-alone or can be integrated with Perkin-Elmer's Series 3200 superminis. It has a Unibus+



operating system, derived from Bell Laboratories' Unix System III. The 7350 comes in three configurations: with a single-user workstation, a color graphics workstation, or a multi-function cluster-controller console. These cost \$8,400, \$10,400, and \$11,750 respectively. Various hardware and operating-system options are available, as well as a range of applications software.

Perkin-Elmer, 2 Crescent Place, Oceanport, NJ 07757.

(201) 870-4500.

CIRCLE 225

Graphics station kit

Three software packages, compatible with a wide range of 8- and 16-bit micros, turn a computer into a complete graphics station that creates slides and prints for documents and presentations. They span all major micro operating systems and a broad range of hardware configurations. Digital Research's GSX provides a graphics interface for any input and output device, including crts, printers, plotters, mice, and light pens. DR Draw allows users to create and edit a variety

of diagrams and costs \$400. The DR Graph chart and graph maker is \$295 for MS-DOS or PC-DOS. DR Access 10, which is a graphics-terminal emulator that receives mainframe graphics on micros, costs \$500.

Digital Research, 160 Central Ave., Pacific Grove, CA 93950.

(408) 649-3896.

CIRCLE 226

Floppy translator

The Texlink-I Floppy Disk Translator transfers information between normally incompatible micros and transfers 8-inch formats to $5\frac{1}{4}$ -inch formats. It can format, read, and write MS-DOS and CP/M files. This means a project can be started on one computer and continued on another. Price: \$8,000. A typical disk can be translated in two minutes. Data can be easily duplicated for use on many different micros.

Formaster Corp., 1983 Concourse Dr., San Jose, CA 95131.

(408) 942-1771.

CIRCLE 227

TRS-80 upgrade

The Micromerlin 16-bit upgrade for the TRS-80 Models I, III, and 4 and the LNW Model I is available with either MS-DOS 2.1 or CP/M-86 operating systems. It includes 128-Kbyte RAM, RS-232 serial port, parallel printer port, and power supply. Price: \$995. Options are also available. The Micromerlin may be used as a printer spooler or semiconductor RAMdisk.

Micro Projects Engineering Inc., 10810 W. Washington Blvd., Culver City, CA 90230.

(213) 202-1865.

CIRCLE 228

PC graphics

Microsoft Chart, running on the IBM PC and compatibles, lets users prepare presentation graphics from Multiplan and other spreadsheets. Price: \$250. Users can select a format from a display of chart pictures and experiment with 45 different forms to determine the most effective format. Users can control size, position, move around objects or text, add arrows, and edit various other features. Charts can be overlaid, and formats can be saved.

Microsoft Corp., 1070 Northup Way, Bellevue, WA 98004.

(206) 828-8080.

CIRCLE 229

Decision support

20/20, a version of the Supercomp-Twenty spreadsheet, is available on the IBM PC under PC-DOS. This compatible software costs \$600 and provides an effective micro-mainframe link. 20/20 combines graphics, data management, and spreadsheet. It also gives users access to central databases, working with other application programs and running on other mainframes and micros.

Access Technology Inc., 6 Pleasant St., S. Natick, MA 01760.
(617) 655-9191.

CIRCLE 230

IBM 370 link

PC Contact is an integrated, interactive communication link between the IBM 370 and Personal Computers. The purchase price is \$60,000 for the mainframe software and \$1,000 per PC. Data can be both downloaded and uploaded and works in conjunction with the Mantis fourth-

generation application-development language. Data can be selected, manipulated, and stored in the PC in any format desired. Mantis is approximately \$30,000.

Cincom Systems, 2300 Montana Ave., Cincinnati, OH 45211.
(513) 662-2300.

CIRCLE 231

IBM reports

The Personal Computer Print Utility (PCPU) from SSI allows reports from a System/34 or S/36 to be printed on an IBM PC. It was designed for users of SSI's 5251 Model 12 emulation and file-transfer utility to allow offline storage and printing of spooled reports. One-time charge is \$75 for the S/34 and \$90 for the S/36, including RPG source code. The PCPU can also be used on personal computers using the IBM Model 11 emulation product which does not support the PC printer.

Software Systems Inc., P.O. Box 1766, Jefferson City, MO 65102.
(314) 635-5852.

CIRCLE 232

Communications package

Access 1-2-3 is a data-communications package for IBM, Columbia, Corona, and Compaq personal computers. It consists of the PC1200B smart modem and Crosstalk XVI software, an intelligent-terminal and file-transfer program. The programmable modem costs \$595, features dialer, auto answer, and audio monitoring, and operates at 300 or 1,200 baud full duplex. The software stores up to 40 log-on passwords and allows for disk-to-disk data transfer.

Novation Inc., 20409 Prairie St., Chatsworth, CA 91311.
(213) 996-5060.

CIRCLE 233

Office-systems catalog: A brochure from Panel Concepts Inc. (Santa Ana, CA) describes and illustrates the System 2Plus, System Three.O, and Fastspace open-office systems.

CIRCLE 234

N5500- The Project Management System That's Getting A Lot Of Attention

Recently, we've been hearing from people who bought somebody else's "project management system." A lot of them discovered that what they really got was a costly, complex time reporting package.

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CIRCLE 99



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CIRCLE 100

MICROSYSTEMS PLUS

File comparison

Filecomp, running under PC-DOS on IBM PCs and compatibles, compares two Basic program files line by line and identifies differences. Price: \$99. It reproduces hard copy for the baseline file containing the original code, the compare-from file containing the altered code, or both. It can be used by advanced programmers, quality-assurance personnel, and configuration-management specialists.

Cobrasoft, 13534 Hawthorne Blvd., Hawthorne, CA 90250.
(213) 644-1135.

CIRCLE 214

Standby power

Minuteman is an uninterruptible power-supply system for most micros, disk drives, and word processors. When power is interrupted, it switches to an emergency battery for up to 15 minutes, automatically switching back when power is restored. Price: \$435. The Minuteman features include a



250-watt rating, surge protection, an alarm, and light signals indicating power status, and an automatically recharging battery.

Para Systems, 11425 Mathias St., Dallas, TX 75234.
(214) 869-1688.

CIRCLE 215

Briefcase system

The 15-pound Sidekick system offers 40-character-by-8-line display, 32-K RAM and 32-K ROM with expansion capabilities, lightweight cassette recorder, thermal printer, modem, parallel and serial ports, and AC adapter. Price: \$1,995. The components, embedded in anti-static foam, can be transported in a briefcase with a combination lock and a latch system that prevents upside-down opening. Basic, word processing, and telecommunications are built in. It also comes with 15 business, utility, and entertainment



programs, as well as a text formatter and a Traveling Software program.

Incom Systems Inc., 4801 24th Ave., N.E., Seattle, WA 98105.
(206) 527-8895.

CIRCLE 216

Electronic spooler

Printer Optimizer is an intelligent device that acts as a spooler and liaison between any computer and several printers. Price: from \$499. It provides separation of computing and printing functions, giving the operator control over the order in which jobs are printed. This spooler can automatically change type between jobs, translate English into foreign characters, reproduce graphics, and make an infinite number of copies. Storage is expandable from 64K to 256K, with an effective



capacity of up to 1 Mbyte in some applications.

Applied Creative Technology Inc., 2156 W. Northwest Hwy., C-303, Dallas, TX 75220.
(214) 556-2916.

CIRCLE 217

Five Zeniths

Three desk-top and two portable computers from Zenith are software- and expansion-board compatible with the IBM PC. They all have 128-K RAM expandable to 640K, two RS-232C serial ports and one parallel port, RGB color output, IBM expansion bus, and detachable keyboard. The portable models also have 9-inch amber mon-

itors. A desk-top system with single floppy-disk drive is \$2,699, a dual floppy-drive system is \$3,099, and a system with a floppy-disk drive and a Winchester disk is \$4,799. Portable models are \$2,799 for single floppy-disk drive and \$3,199 for dual drives.

Zenith Data Systems, 1000 Milwaukee Ave., Glenview, IL 60025.
(312) 391-8744.

CIRCLE 218

Development tool

JETIII, which runs under most micro operating systems, is an integrated applications-development system and multi-user database manager. A single-copy for six users costs \$40,000. It automatically generates code for many standard functions and has several programming aids to increase programmer productivity. JET-III can also accommodate relational, hierarchical, and network-database structures and integrates applications software with Bizwiz modules from the same company. A report writer is also included.

Jetsoft Inc., 170 Main St., East Falmouth, MA 02536.
(617) 548-6670.

CIRCLE 219

Apple file transfer

Version 5.0 of Transend communications software for Apple allows multiple files—Pro-micros DOS, CP/M, and Pascal—to be transferred with one phone call. Three different software programs are needed. The Transend 1 data-capture package is \$89. Transend 2, which also includes error-free file transfer, is \$149. Transend 3, which includes 1 and 2 plus unattended electronic mail, costs \$275. Transend 1 owners can upgrade to Transend 2 for \$49, including the update to Version 5.0. Update charge is \$25.

Transend Corp., 2190 Paragon Dr., Santa Fe, CA 95131.
(408) 946-7400.

CIRCLE 220

Information retrieval for HP 3000: Knowledge/3000 from DMCS (Auburn, CA) provides an index to the HP 3000 system documentation, cross-referencing all manuals. Users can inquire by key words and author. It's available on a yearly subscription.

CIRCLE 221

SECURITY

Restricted access

The Access system-management security program limits access to specific programs or commands from VT100-compatible terminals running under the VMS operating system. Price for the basic menu is \$1,200; program-support FMS screens are \$1,200; full-security features are \$1,200. Any program can be tied into Access. The package restricts the access of individual users, groups of users, or crts.

Precision Business Systems, 33 Rec-tor St., New York, NY 10006.
(212) 425-0200. **CIRCLE 242**

CICS system

Alert/CICS is an advanced online security system for IBM mainframes under the CICS teleprocessing system. A permanent license is \$12,180 for OS and \$9,100 for DOS. A three-year license is also available. It allows users to establish the security structure needed in each network area. You can secure transactions, files, programs, and

maps without changing user programs.
Goal Systems International Inc., 5455 N. High St., Columbus, OH 43214.
(614) 888-1775. **CIRCLE 243**

Data encryptor

The Info-Lock-1027 encryption device protects information transmitted over communications media including terrestria, microwave, and satellite facilities. A basic unit costs \$2,668. The secret-key variable, which specifies the formula for scrambling data, can't be read off the device. Controls are protected by pick-resistant locks.



Paradyne Corp., 8550 Ulmerton Rd., Largo, FL 33540.
(813) 530-2000. **CIRCLE 244**

IMS support

Top Secret software for IBM under MVS and MVS/XA supports IBM's Information Management System without making any modifications to IMS. The monthly lease cost is \$900 for the first cpu and \$550 for each additional cpu. It provides both sign-on and transaction security through all IMS region types. This release adds support for DL/I and provides program-specification block and database definition security.

CGA Software Products Group, 960 Holmdel, NJ 07733.
(201) 946-8900. **CIRCLE 245**

Encryptor/decryptor

When S-Crypt 500 Link Encryptors are placed on each side of a communications line, data is encrypted on one end and decrypted on the other. The price is under \$1,000.

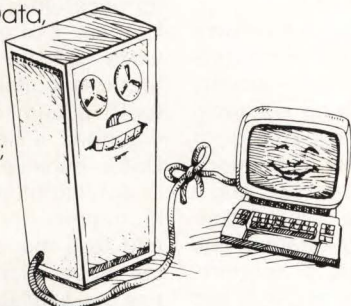
Computer Systems and Resources, 1610 Mt. Vernon Ave., Alexandria, VA 22301.
(703) 684-8445. **CIRCLE 246**

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PC PLUS marries the convenience of personal computing to the expansive storage capacity and management capabilities of IBM mainframes to create an efficient, low-cost way to maintain and report from large data bases with simple PC operation.

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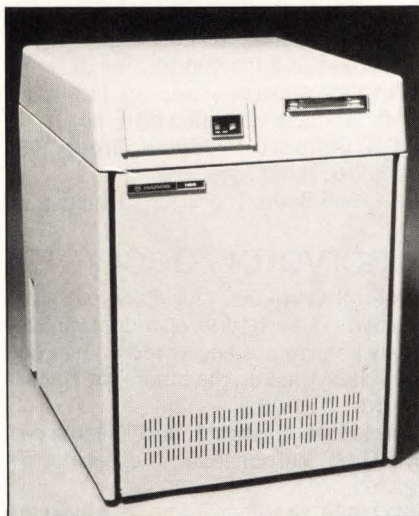
Nobody offers more.

CIRCLE 102

SYSTEMS

Harris supermini

The H60 super-minicomputer operates at almost a million instructions per second. Prices start at \$69,500. It has main memory expandable to 12 Mbytes as well as virtual memory and cache memory. The multi-user system

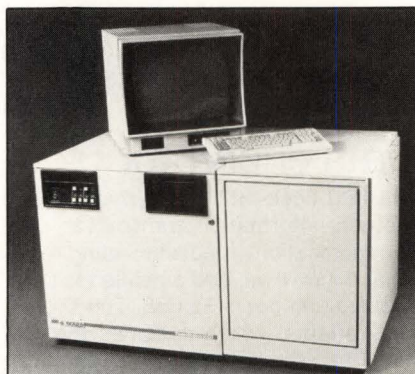


has capabilities for office automation, database management, financial planning, word processing, computer-aided design, communications, networking, and IBM 3270 emulation.

Harris Corp., Computer Systems Div., 2101 W. Cypress Creek Rd., Ft. Lauderdale, FL 33309.
(305) 974-1700. **CIRCLE 277**

Various minis

Concept 32/97, a 32-bit super-mini-computer, has a processing rate of 4.67 million instructions per second (mips) to over 10 mips and offers cache memory of 32 Kbytes to 128 Kbytes. Price: \$245,000 to \$495,000. Powerstation 5000 is a high-resolution graphics station based on Bell Labs' Unix operating system. It offers networking and communications capabilities and has a subsystem that speeds application development. Price: \$99,000. The Power-node 6000 is a Unix-based 32-bit virtual processor with a price range of \$80,000 to \$150,000. It can be used in a network or as a stand-alone processor with multiple terminals. Three basic configurations vary in packaging and expansion capabilities. Two CAD/CAM workstations are turnkey hardware/software systems for mechanical design. Tool paths can be simulated with solid representations as well as with



outline drawings. The PS3100 system starts at \$69,900. Model PS5100, with a color-graphics terminal and solid-modeling software, starts at \$115,000; dual-user systems start at \$152,500.

Gould Inc., Computer Systems Div., 6901 W. Sunrise Blvd., Fort Lauderdale, FL 33310.
(305) 587-2900. **CIRCLE 278**

Wang supermini

The VS 300 is a 32-bit system with a high-performance processor and a memory-management system. An entry-level system with 4 Mbytes of main memory costs \$170,000. It supports up to 16 Mbytes of main memory as well as 32 Kbytes of cache memory. It performs up to 255 concurrent user tasks, supports up to 192 workstations and printers, has disk-storage capacity of over 20 gigabytes, and offers an optional floating-point accelerator. It also supports office automation, distributed data processing, commercial-transaction processing, and communications.

Wang Laboratories Inc., One Industrial Ave., Lowell, MA 01851.
(617) 459-5000. **CIRCLE 279**

Business family

The three latest models of Nixdorf's 8870 family of business computers feature print spooling, data-security features, and programming enhancements. Model 10 can support eight workstations, 512 Kbytes of memory, 20 million bytes of disk storage, and a wide variety of printers. Typical configuration with one workstation and printer is \$22,400. Model 35 supports 16 workstations and is available at two levels, one with 256 Kbytes of memory, and one with 512 Kbytes and a hardware arithmetic unit. Typical configuration with 256 Kbytes and four

workstations is \$47,500. Model 55 supports 28 display workstations and 1 million bytes of memory and also is available at two levels. Typical configuration with 10 workstations, three printers, and arithmetic unit is \$86,500. All come with applications software. The \$32,500 Model 10 of the 8890 Compatible Information System family is designed for decentralized applications in networks. It supports asynchronous, BSC, and SDLC protocols simultaneously and can be used as a central processor in SNA networks.

Nixdorf Computer Corp., 300 Third Ave., Waltham, MA 02154.
(617) 890-3600. **CIRCLE 280**

Array processors with IBM link

The FPS-5500 and FPS-5600 families of array processors have high-speed data-streaming interfaces for the IBM 370, 30XX, and 43XX. Data transfers can be controlled by programs on the host or the array processor. Prices begin at \$98,000 for the FPS-5500 Series and \$134,000 for the FPS-5600 Series.

Floating Point Systems Inc., P.O. Box 23489, Portland, OR 97223.
(503) 641-3151. **CIRCLE 281**

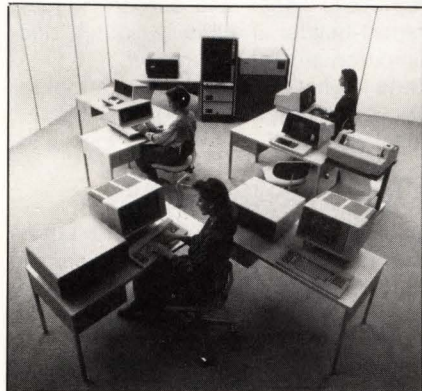
32-bit workstations

Two new computational nodes function as powerful 32-bit supermini workstations. The DN460, with 1 Mbyte of main memory, is \$39,500; the DN660, with 2 Mbytes, is \$59,500. The DSP160 Domain Computational Server Processor has 2 Mbytes of main memory, three asynchronous I/O ports, and network interface. Price: \$37,500. A Domain Ethernet gateway for local-area networking is \$3,500. Domain Professional Support Services (DPSS) software with graphic features consists of five integrated tools: document, mail, file, calc, and calendar. Price is \$500 per node. DSEE engineering software consists of configuration management, history management, advice management, and task management. Price: \$1,500 per node. Communications capabilities are available for use between the Domain system and other computers.

Apollo Computer, 15 Elizabeth Dr., Chelmsford, MA 01824.
(617) 256-6600. **CIRCLE 282**

Sperry systems

The Sperry 1900/20 and XL/60 Distributed Processing and Capture systems provide greater functionality and power than previous models. They feature an ANSI '74 Cobol Compiler and intelligent workstations. A Multiport Communications Processor pro-



vides two or four concurrent communications ports; two protocols can be loaded in its memory at a time. A typical 1900/20 system with

128-Kbyte memory, five crts, tape drive, and 30-Mbyte disk drive is \$80,060, or \$2,261 per month on a five-year lease.

Sperry Corp., P.O. Box 590, Blue Bell, PA 19424.
(215) 542-4213.

CIRCLE 283

Manufacturing control on Sperry

A manufacturing-control system consists of Univisa software running on the System 80 with a minimum of 512-Kbyte memory expansion, one workstation, diskette subsystem, line printer, and disk subsystem. Univisa consists of five main modules: bill of material/inventory control, scheduled receipts, material-requirements planning, product costing, and shop-floor control. Hardware/software price is about \$150,000. Lease price for software system is \$350 monthly.

Sperry Corp., P.O. Box 500, Blue Bell, PA 19424.
(215) 542-4213.

CIRCLE 284

Slide system

The TTS/Plus Table Top Slide System yields 20 to 60 slides an hour with 4,000- or 2,000-line resolution. It also creates graphics, including free-flowing designs in many different colors. The system consists of a stand-alone minicomputer, film recorder,



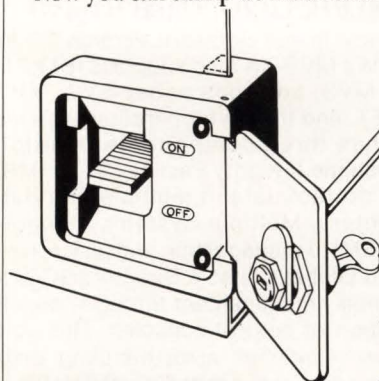
full-color video monitor, black-and-white crt with keyboard, and an electronic tablet with cursor. Price: under \$100,000.

Management Graphics, 1401 E. 79th St., Minneapolis, MN 55420.
(612) 835-9764.

CIRCLE 285

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CIRCLE 103



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CIRCLE 104

SOFTWARE

Shared DASD

Version 7.3 of Super-MSI allows shared DASD users to maintain dataset integrity during migration to IBM's XA. The monthly lease price is \$675. There is no need to lease DFP/370 from IBM for non-XA machines, so costs are reduced. There are other enhancements to simplify the use of this version. **CGA Software Products Group Inc.**, 960 Holmdel Rd., Holmdel, NJ 07733. (201) 946-8900. **CIRCLE 247**

Crt switching

Virtual software provides fast switching of a crt terminal between IBM computers under VM. Lease price is \$4,000. With one keystroke, a 3270-type terminal switches from a current job to any other operational virtual-machine console. There is no need to log-off, log-on, or disconnect. Any number of console assignments may be added or deleted. **Westinghouse Electric Corp.**, Advanced Systems Technology, 777 Penn Center Blvd., Pittsburgh, PA 15235. (412) 824-9100. **CIRCLE 248**

Enhanced DBMS

Release 2.0 of the CA-Universe relational database management system for mainframes under DOS/VSE, MVS, and VM/CMS has several enhancements. These include automatic forms/screen generator, improved I/O performance, screen chaining, multiline data entry, single screen/multiline data entry, and single-screen/multirelation updating. Price: \$110,000 for DOS/VSE and \$140,000 for MVS and VMCMS. **Computer Associates International Inc.**, 125 Jericho Tpk., Jericho, NY 11753. (516) 333-6700. **CIRCLE 249**

Document manager

Two document-retrieval-and-management packages are available for the IBM 4300, one running on the DOS/VSE operating system under CICS and the other on OS/MVS under CICS. Price: \$25,000 each. Both support mixed media, such as film, fiche, and optical disk, within the same applica-

tion. A master-record file allows most documents to be retrieved in less than 5 seconds.

3M Office Systems, Dept. OS84-24, P.O. Box 33600, St. Paul, MN 55133. (612) 733-1110. **CIRCLE 250**

Finance for IMS

IMSDC versions of online financial modules are now available. General ledger begins at \$87,000, accounts-payable/purchase-control begins at \$57,000, and fixed-asset accounting begins at \$49,000. Users can custom-tailor screens without changing programs, access records by entering data to partially identify them, and combine inquiry and data entry on the same screen.

Data Design Assoc., 1279 Oakmead Pkwy., Sunnyvale, CA 94082. (408) 730-0100. **CIRCLE 251**

Query system

Imagine, which runs under CICS/VS, is an information-center reporting and query system available for several operating systems. It's entirely menu-driven; users need not learn syntax, vocabulary lists, or file structures. It reads and integrates existing VSAM, ISAM, or sequential files and provides a logical view of the data with no user modification or reformatting. It also offers an integrated print-management system, a batch-report generator, an administration facility, and access control. Price: \$59,500 for OS versions and \$45,000 for DOS.

Multiplications Inc., 1050 Massachusetts Ave., Cambridge, MA 02138. (617) 846-5810. **CIRCLE 252**

DG finance pack

Comprehensive Financial Operations is an integrated, interactive package for Eclipse MV-based distributed-data-processing systems; it is compatible with Data General's Comprehensive Electronic Office system. Prices are \$48,000 for general ledger and financial control, \$34,000 for accounts payable, \$38,500 for purchase ordering, \$48,000 for accounts receivable and credit management, and \$32,500 for materials

management. The software comprises five modules and there are six integrated tools to facilitate user tailoring of features. These are screen-builder, report-builder, inquirer, validator, documentor, and table manager.

Data General Corp., 4400 Computer Dr., Westboro, MA 01580. (617) 366-8911. **CIRCLE 253**

DEC packages

The Indas (Integrated Data Analysis System), a statistical-analysis package for DEC VAXs, handles everything from raw data to finished tables and charts. Price: \$4,000 to \$5,000, depending on machine size, with an annual renewal fee of \$2,000 to \$2,500. Version 5.0 of the TSX-Plus operating system, for PDP-11- and LSI-11-based systems, has improved response time, real-time capability, and editing capability. It also allows 18-bit DMA devices to access up to 4 Mbytes of memory. Price: \$2,000. Version 5.0 of Cobol-Plus, for RT-11 and RT-11XM single-user systems and TSX-Plus multi-user systems, features extended-memory support and compact "SAV" files to save storage disk space. Price: \$2,000.

S&H Computer Systems Inc., 1027 17th Ave. S., Nashville, TN 37212. (615) 327-3670. **CIRCLE 254**

Multi-cpu manager

Single Image Software Version 7.1 for IBM's MVS-XA also supports IBM PTF in MVS, and runs under SVS, MVT, MFT, and the MVS operating systems. It has three components: Multiple Systems Integrity Facility (Super-MSI) to protect data in multiple-cpu data centers, Multiple Systems Manager (MSM) to manage tape and disk drives, and Global Console Director (GCD) to simplify management through consolidation of control consoles. This software simplifies error-handling diagnosis and reduces the number of load modules and library-size requirements. Annual lease price: \$7,000 for Super-MSI and \$5,000 each for MSM and GCD.

CGA Computer Associates Inc., 960 Holmdel Rd., Holmdel, NJ 07733. (201) 946-8900. **CIRCLE 255**

VAX utilities

Quickstar is a set of three related programs designed to increase VAX efficiency. Price: \$1,700. With Quickstat, managers can see who is doing what, where, and with which resources. Quicktalk enables users to send messages to any other user or connected terminal with a simple command. It also allows users to change from one user name to another without logout/login.

Signal Technology Inc., 5951 Encina Rd., Goleta, CA 93117.
(805) 683-3771.

CIRCLE 256

Graphics support

ADR/Dataquery relational query system offers interactive color-graphics support for the IBM 3278

video, 3279 color video, and 3287 printer terminals under CICS using the IBM GDDM graphics system. There are six graph types and a variety of presentation options. Dataquery costs \$18,800 for OS and \$14,600 for DOS.

Applied Data Research Inc., Route 206 & Orchard Rd., Princeton, NJ 08540.

(201) 874-9000.

CIRCLE 257

IMS development

With the ADR/DL application-development system, high-level Cobol IMS programs can be quickly built, tested, and debugged. Permanent license: \$35,700; leases are also available. Generic types of programs are prerecorded to eliminate repetition from program to program. A high-level command set is used to access IMS

databases. The program has various other features to boost productivity.

Applied Data Research Inc., Route 206 & Orchard Rd., CN-8, Princeton, NJ 08540.

(201) 874-9000.

CIRCLE 258

MVS facilitator

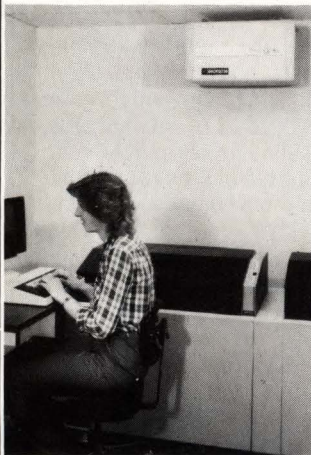
The Catalog Performance Optimizer (CPO) for MVS systems intercepts Catalog-Management calls and maintains a dynamically managed list of Control Volume alias entries and related entries. Price: \$7,500. CPO eliminates the job of master-catalog searching, improves throughput, eliminates bottlenecks, and reduces cpu overhead.

Duquesne Systems Inc., 2 Allegheny Ctr., Pittsburgh, PA 15212.

(412) 323-2600.

CIRCLE 259

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CIRCLE 106

SOFTWARE

Source-code library

Codebank, running on IBM's S/38, catalogs source modules and generates programs from them. When a user enters modules, it links them together and becomes a self-customized program generator. Price: \$950 per cpu. Modules can be easily found, entered, retrieved, and changed. The user guide is free.

Help/38 Systems, 15102 Minnetonka Industrial Rd., Minnetonka, MN 55345. (612) 935-3311. **CIRCLE 260**

Tape management

Release 5.00 of the Valu-Lib tape library-management system runs on the IBM 30XX and 4300 under MVS and VS1, or on VM/370 under OS with an interface. This release offers additional options for cataloging datasets, more detailed movement and location facilities for tape volumes, and enhanced security. Users can maintain consistency between Valu-Lib and the system catalog, can extend retention

of datasets found in the catalog, and can create an auxiliary catalog for catalog-checking routines. Price: \$20,000, or \$1,834 monthly for a 12-month lease.

Value Computing Inc., 498 N. Kings Hwy., Cherry Hill, NJ 08034. (609) 482-2500. **CIRCLE 261**

Performance testing

With Performance Simulation System (PSS) for VAX, users can record terminal sessions in order to replay them under various scenarios. License fee: \$4,995 for VAX-11/780, \$3,495 for VAX-11/750, and \$1,995 for VAX-11/730. The three main facilities provided are performance testing, application reliability, and security. The method of capturing input and output is completely transparent. Applications reliability can be verified by comparing the original output log to the playback output log. PSS can monitor/playback any terminal device that uses the VMS Terminal Class driver. It also monitors terminal ports

connected to modems for security.

Advanced Systems Concepts Inc., 22 Hudson Place, Hoboken, NJ 07030. (201) 798-6400. **CIRCLE 262**

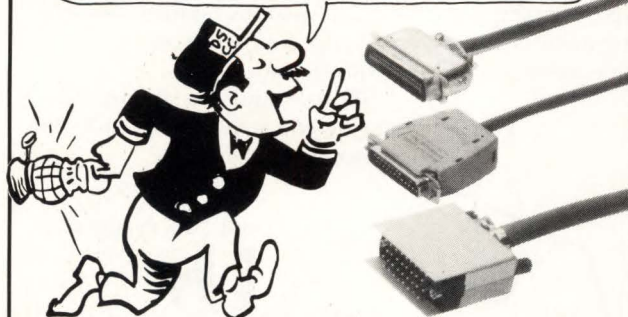
Mantis application-development system

Release 3.7 of the Mantis fourth-generation application-development system has expanded capabilities for prototyping, documentation, and file access. Users can access Cincom's TIS Logical User View, which insulates programs from the DBMS and physical environments. Capabilities to access the DL/1 file structure have also been expanded. Single-use charge for Mantis TIS-DC begins at \$21,000 for one to eight terminals; charge for CICS begins at \$23,000. DBMS support is \$5,000, External Logical View support is \$5,000, and DL/1 support is \$9,950.

Cincom Systems Inc., 2300 Montana Ave., Cincinnati, OH 45211. (513) 662-2300. **CIRCLE 263**

The Conductor on the DATA SET LINE © *by George*

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CIRCLE 107

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CIRCLE 108

ACCESSORIES

Barcode labels

Scanrite self-adhesive labels come in a broad range of materials, adhere to virtually any other material, and are available in both permanent and removable adhesives with various degrees of opacity. About 250,000 8 $\frac{1}{2}$ -inch-by-11-inch die-cut sheets on plain paper stock cost \$100; the same amount on latex-impregnated flex, which is durable and removable, costs \$180. They can be used on most continuous or sheet-fed high-speed non-impact printers.

Avery Label Business Systems, 777 E. Foothill Blvd., P.O. Box R, Azusa, CA 91702.

(818) 969-3311.

CIRCLE 272

Crt support

The Swing-arm Platform raises a terminal above a desktop, allowing the user to swing the computer out of the way. It supports up to 250 pounds, accommodates most crt's, and costs \$395. It comes in three platform sizes

with any of three mounting devices. The Articulating Keyboard Tray tucks a keyboard under any Westinghouse work surface while still allowing knee clearance. The tray is adjustable and comes in three models ranging from \$240 to \$295.

Westinghouse Furniture Systems, 4300 36th St., S.E., Grand Rapids, MI 49508.

(616) 949-1050.

CIRCLE 273

Tape maintenance

The Tester is a family of modular intelligent tape-maintenance products which can be leased or purchased as required. It comprises a magnetic tape cleaner, a tester, and an analyzer and features field-upgradable electronics, microprocessor-function control, programmable analysis, and buffered memory. The magnetic-tape-testing system is \$13,995; a broad variety of options can be added in the field.

Data Devices International, 20235 Bahama St., Chatsworth, CA 91311.

(818) 998-2900.

CIRCLE 274

Cleaning kits

Dual-Purpose Floppy Disk Head Cleaning Kits are available for 5 $\frac{1}{4}$ - or 8-inch drives. Each disk cleans both single- and dual-sided drives. A kit with two cleaning disks, aerosol cleaner, and wet and dry pads costs \$24. Microcomputer/Word Processor Datakits in reusable vinyl cases contain products to clean crt screens, keyboards, and exterior machine housing. A kit with a crt pump spray is \$43; a kit with added presaturated pad cleaners is \$48.

The Texwipe Co., P.O. Box 308, Upper Saddle River, NJ 07458.

(201) 327-9100.

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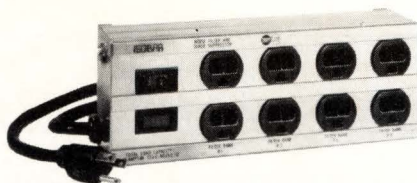
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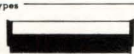
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by Mary Miles, New England Editor

YOUR CAREER

Getting away from it all

What have you done for yourself this summer? Has your only R&R been to catch a frenetic weekend with your family at a crowded beach, preside over a couple of backyard barbecues, or sleep late on a Sunday morning now and then? Is it possible that your family went on vacation . . . without you?

During these waning days of summer, as fellow workers appear on Monday mornings with healthy tans, photos of Cape Cod beaches, and stories of the big fish that got away, are you pining for some peace and quiet—a chance to get away from it all? Do you hear yourself saying, “I can’t let up now; I’ll take a break later. I’ll get away for a few days, or even a week, when things are less busy—there’s just too much going on at the moment. Maybe during the Christmas holidays or next spring . . .”

It could be time to take a serious look at *why* you keep putting off a breather for yourself. Is it really the demands of the job or your own demands of yourself? Some managers make a certain amount of getaway time a priority; some constantly talk about their need for a rest but never really do much about it; and some choose, rather deliberately, to do without it.

There are several reasons for these differences. Spurred by a need to be needed, some managers work obsessively and without pause, fearing they, or others, might discover they’re *not* indispensable. The wheels will turn smoothly despite their absence. And there’s a similar insecurity, one that demands near-perfection: 110 percent personal involvement in work, and a sort of lust to reach for ever-higher accomplishments even though

you’ve barely enjoyed those already won. “Never satisfied” might be the motto of such driven, time-pressured individuals.

For still others, never taking a break may be a matter of choice. Work is simply the most important

part of their lives. They may shudder at the thought of being away from the nonstop demands of a high-pressure job. “Put me in a chair on the beach, and I’d have a real anxiety attack—or worse,” they say. Craving the constant activity and a never-ending pace, they may claim a next-to-impossible schedule is a real turn-on,

A really big getaway

Many corporations recognize the importance of vacations, but some are also offering sabbaticals as a way for executives and managers to rejuvenate and expand themselves. Dr. Ralph Hirschowitz, a psychiatrist at the Levinson Institute, Belmont, MA, believes the practice is catching on with a few enlightened companies. “Sabbaticals can be anything from a fairly rigorous advanced-management program to courses in the humanities or other areas that are unrelated to work,” he says. “They can also be free-form.”

Rolm Corp., a Santa Clara, CA-based maker of telecommunications equipment and military computers, is one of those enlightened few. Gibson Anderson, director of human resources, used a company-sponsored sabbatical to travel extensively with his wife seven years ago. The experience gave him time to reevaluate his career, says Anderson. He then made a satisfying shift from engineering to his present field. Rolm offers sabbaticals of up to three months at the end of six years of employment and one every seven years thereafter to all employees, from the lowest-paid right up to the top

brass.

Employees may do whatever they want with this time—the only restriction is they may not work for money. Most view the time as an extended paid vacation; several hundred employees have gone on sabbaticals and the value to them and the company has been immense, says Anderson. “One benefit of the program,” he says, “is that it forces the company to do succession planning so that it can function without key people.” In addition, he adds, the program has reduced turnover, a significant benefit in a high-technology business, and vastly increased employee satisfaction and productivity.

Are workers fearful of missing out on big projects, promotions, and opportunities while they’re gone? Not necessarily, says Anderson. The company gives employees a year to decide about their sabbaticals. During that period, they can pick the best time, train a replacement, set things in order, and plan what they will do while they’re away from work. Although a sabbatical is optional, so far—not surprisingly—everyone eligible has taken advantage of the opportunity.

more exciting and challenging than anything else.

It's difficult to ascertain the effects of workaholism, and whether or not, in the long run, they are deleterious to the individual and the corporation. The current emphasis on "Type A" personalities (see "Your Career," April) seems to imply that it's a mostly negative behavior pattern, one that will likely culminate in harm to the person and even the organization.

However, William Theobald, professor of recreation studies at Purdue

It may be time to take a serious look at why you keep putting off a breather for yourself.

University (Lafayette, IN), says research he's conducting is turning up some surprising findings. Data from the first four years of a 10-year study of the work habits of CEOs from 60 Fortune 500 companies indicate that not all those who seldom take a vacation are heading for trouble, he says.

On the whole, says Theobald, the subjects of his study are healthy, physically fit, and emotionally stable. Work occupies their lives like nothing else can (or seems to). Typically, they are creative, dynamic people (some only sleep four or five hours a night). When—and if—they go on vacation, they are preoccupied with work: They take their briefcases with them, call the office several times a day, and often return to work early.

"Sixty percent of those in the study haven't taken a vacation for at least three years," continues Theobald. "Many find that the preparation to

get away is just not worth the effort. . . . They don't see leisure or vacations as being very profitable."

Do they get away from their work-life at all—through retreats, physical activity, meditation—to keep their heads on straight? Says Theobald: "By and large, no—work seems to do that for them. They claim to feel most creative, productive, and happy when they're at work."

But, are they really happy?

Theobald's conclusions at the end of the 10-year study should be interesting. Perhaps a subsequent study of the physiological and psychological impact of workaholism will reveal why it benefits some people. But even if utter dedication to the job is personally satisfying and healthy for some, there are several caveats worthy of mention.

First, the men and women in Theobald's study are CEOs. As Theobald observes, "They travel first-class on company jets, eat in the best restaurants, stay in the finest hotels, and often take business trips to exotic places."

Second, as Theobald readily admits, the lifestyle of these movers and shakers sometimes makes life more than a bit difficult for their families. "We've had a couple of people in our study who have even called subordinates on honeymoons," he says. Often, such people, not needing breakaway times for themselves, find it hard to comprehend that others may have different needs. They are apt to expect their associates and subordinates to be literally on call—during vacations, at the theater, anytime and anywhere. Some have been known to routinely telephone their people with new ideas or instructions at any hour—so excited and driven by

their total commitment are they—inadvertently causing others to suffer.

Third, even when confirmed workaholics claim that job satisfaction, achievement of personal and corporate goals, and emotional and physical well-being go hand in hand, isn't it a bit strange that many of them admit a vacation or unexpected idle time can drive them crazy? When one man suffered a serious ankle fracture and was told he had to stay in the hospital for almost a week, he virtually boasted, "I thought I'd have a

Many workaholics say a vacation or unexpected idle time can drive them crazy.

coronary after two days of that. Absolutely nothing to do! You'd better believe I pulled a few strings to cut myself loose, fast!"

If relaxation is stressful, how healthy can a person really be? It might be wise to remind yourself that there's a difference between being hard-driving and being driven. Even if you believe the pressure of your job makes it impossible to get away, you may be doing yourself and your employer a serious disservice by neglecting your leisure time. If your head is so chock-full of today's needs, tomorrow's worries, and next week's demands that you feel as though it may burst, both your body and your psyche are probably in need of a tune-up.

The purpose of a tune-up is to revitalize yourself, boost your morale, and renew your enthusiasm so that you'll be capable of fresh thinking, increased productivity and efficiency,

YOUR CAREER

and enhanced physical and emotional well-being.

One man confided recently that he'd stopped seeing his psychotherapist after he began swimming. "As I began to swim regularly, at 7 a.m., my work tensions eased," he said, "I've started to notice early-morning things, like misty fields and blossoming yards, rather than how crazily other people seem to be driving. I've stopped being in such a hurry. I was going to a shrink because I didn't know how to relax any more, and even a vacation was a horror, because my head didn't leave the job. Now, three or four times a week I take a mini-break in the pool. While I swim I don't worry!"

A tune-up also can be a weekend stay at a health farm or spa to shed some tensions (and often a few pounds, too) and reestablish healthful living habits. It can be momentary, such as making it a point to spend at least 10 minutes of every lunch hour indulging yourself in good thoughts and fantasies.

Sound like impossibly easy solutions? To prove the value of even a nonphysical getaway, try this: Sit in a comfortable chair in a quiet place. With your eyes closed, relax as much as possible. Breathe deeply, and whenever you feel like it, mentally repeat the word *one*, or any other non-emotional word—slowly. If intrusive thoughts enter your consciousness, let them. When they're gone, repeat the mantra again. (Traditionally, a mantra has been one or several words intoned to evoke a prayerful or meditative state of mind.) You may find, after five or 10 minutes of this very elementary form of meditation, that you've tuned out tension, leaving you feeling calm and relaxed.

Of course, the most obvious getaway is the plain old yearly vacation. Interestingly, the days when you could complain that you only took four days last year, and didn't really know if you'd find time to take this year's three weeks, may be disappearing. Most corporations are discovering that employees who are compulsive in their work habits don't

necessarily perform well. Consequently, many are requiring employees to take all their allotted vacation time each year.

Dr. Ralph Hirschowitz, a psychiatrist with the Levinson Institute (Belmont, MA), approves of this trend. "On these matters, you don't need uncommon sense when common sense will do," he observes. "People who endure, prevail, and sustain their motivation take regular vacations. This allows them to develop a balanced life, and results in greater longevity, fewer illnesses, and healthier relationships. They also do better in their careers." Many corporations have reached the same conclusion.

With these thoughts in mind, wouldn't it be smart to start applying

Many corporations are requiring employees to take all their allotted vacation time each year.

yourself to vacation planning as intelligently as you do to the working part of your career? If a getaway can do so many good things for you, surely you should be willing to take the time and effort to carefully plan to make it an experience that will enhance your life. Below are some guidelines to help you manage your vacation well.

Plan ahead. Arrange for someone to temporarily shepherd your job responsibilities. (Remember that part of every good manager's job is to groom a replacement.) If you don't, and return to a mountain of mail, messages, and problems, you'll be doubly discouraged from trying to make another getaway.

Don't overschedule. To plan a visit to the Epcot Center on Day 1, deep-sea fishing on Day 2, a visit to both sets of grandparents on Days 3 and 4, and so on, is to invite fatigue, frustration, and disaster. Establish a pace that will allow for bad weather, travel, and spontaneity.

Don't take work with you. If it's there and you don't do it, you'll feel guilty. If you do it, you'll hate yourself for being a glutton for punishment—and so will your family.

Don't let the company manipulate your plans. If you plan far enough in advance, there's rarely any excuse for your boss to request last-minute alterations. If you've delegated your responsibilities thoughtfully, chances are slim you'll get panicked calls while you're away.

Do something you want to do. Sure, the kids may want to go horseback riding, your spouse may have a luxury seaside gambling casino in mind, and your sister may expect you to stay for a week, but your getaway should accommodate your needs for R&R as well. Some people advise taking a vacation that gives the kids one week away, you and your spouse a week alone, and two weeks for the family to spend together.

When you get back, allow yourself a phase-in period. It's difficult to get home on a Sunday night and go to work the next day knowing there's a lawn to be mowed, mail to be opened, pets to be picked up, groceries to be bought, and 213 phone calls to be made. Better to come home two days early and use the day before you return to work to catch up.

When you get to the office, don't try to accomplish everything in one day. The person who temporarily assumed your responsibilities should help. Give yourself leeway: Some calls, letters, and problems can wait. The longer you can hold on to the relaxing feeling of your vacation, the easier it will be for you to get back into the saddle at work.

Planning your getaway—whether it's for 10 minutes, a Sunday afternoon, a weekend, or a month—is the best thing you can do to enhance your value as a human being and an effective member of the corporate team. If you've let this summer slip by without that tune-up, it's not too late to do something about it. The costs are small and the rewards to both you and your company can be rich. □

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